



Economic Commission for Europe**Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Automated/Autonomous and Connected Vehicles*****First session**

Geneva, 25-28 September 2018

Item 6 (d) of the provisional agenda

Autonomous/automated and connected vehicles:**Automatically Commanded Steering Function****Proposal for a Supplement to UN Regulation No. 79 (Steering Equipment)****Submitted by the experts from the International Organization of Motor Vehicle Manufacturers and European Association of Automotive Suppliers****

The text reproduced below was prepared by the experts from the International Organization of Motor Vehicle Manufacturers (OICA) and European Association of Automotive Suppliers (CLEPA). It contains a proposal for amendments to the requirements for Automatically Commanded Steering Functions (ACSF) of Category C, which has been presented at the meeting of the Informal Working Group (IWG) on ACSF in Tokyo in January 2018. This text proposes specific provisions for the use of a lane change function with a so-called two-step Human Machine Interface (HMI). The original proposal has been amended, taking into account the comments received from contracting parties. The modifications to the existing text of the Regulation (in ECE/TRANS/WP29/2018/35) are marked in tracked changes.

* Formerly: **Working Party on Brakes and Running Gear (GRRF)**.

** In accordance with ECE/TRANS/274, para 52), with ECE/TRANS/WP.29/1139, para. 33 and with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.



I. Proposal

Paragraph 5.6.4.6.4., amend to read:

"5.6.4.6.4. The lateral movement of the vehicle towards the intended lane shall not start earlier than 1 second after the start of the lane change procedure. Additionally, the lateral movement to approach the lane marking and the lateral movement necessary to complete the lane change manoeuvre shall be completed as one continuous movement.

~~The lane change manoeuvre shall not be initiated before a period of 3.0 seconds and not later than 5.0 seconds after the deliberate action of the driver described in paragraph 5.6.4.6.2. above.~~

The lateral movement may be initiated automatically or by a second deliberate action of the driver.

The lane change manoeuvre shall commence not earlier than 3 seconds and

- (a) Not later than 5.0 seconds with an automatic initiation, or
- (b) Not later than 7.0 seconds with an initiation by a second deliberate action,

Following the deliberate action of the driver to start the procedure described in paragraph 5.6.4.6.2.

The second deliberate action shall be performed at the latest 4 seconds after the lane change procedure.

The control to operate the second deliberate action shall be located in the steering control area."

Paragraph 5.6.4.6.7., amend to read:

"5.6.4.6.7. The direction indicator shall remain active throughout the whole period of the lane change manoeuvre and shall be deactivated by the system no later than 0.5 seconds after the resumption of ACSF of Category B1 lane keeping function as described in paragraph 5.6.4.6.6 above. **Automatic deactivation of the direction indicator is only required if the lane change manoeuvre is initiated automatically without a second deliberate action.**"

Paragraph 5.6.4.6.8.1., amend to read:

"5.6.4.6.8.1. The lane change procedure shall be suppressed automatically by the system when at least one of the following situations occurs before the lane change manoeuvre has started:

- (a) The system detects a critical situation (as defined in paragraph 5.6.4.7),
- (b) The system is overridden or switched off by the driver,
- (c) The system reaches its boundaries (e.g., lane markings are no longer detected),
- (d) The system has detected that the driver is not holding the steering control at the start of the lane change manoeuvre,
- (e) The direction indicator lamps are manually deactivated by the driver,

(f) ~~The lane change manoeuvre has not commenced within 5.0 seconds following the deliberate action of the driver described in paragraph 5.6.4.6.2.;~~ Following the deliberate action of the driver to start the procedure described in paragraph 5.6.4.6.2., the lane change manoeuvre has not commenced:

- (a) At the latest after 5.0 seconds with an automatic initiation,
- (b) At the latest after 7.0 seconds with an initiation by a second deliberate action,

Whatever is appropriate.

(g) The system, with an initiation of the lane change manoeuvre by a second deliberate action, has not detected the second deliberate action at least 4.0 seconds after the start of the procedure.

(ge) The lateral movement described in paragraph 5.6.4.6.4. is not continuous.

Annex 8,

Paragraph 3.5.1.2., amend to read:

"3.5.1.2. The requirements of the test are fulfilled if:

- (a) The lateral movement towards the marking does not start earlier than 1 second after the lane change procedure was initiated,
- (b) The lateral movement to approach the lane marking and the lateral movement necessary to complete the lane change manoeuvre are completed as one continuous movement,
- (c) The recorded lateral acceleration does not exceed 1 m/s^2 ,
- (d) The moving average over half a second of the lateral jerk does not exceed 5 m/s^3 ,
- (e) The measured time between the start of the lane change procedure and the start of the lane change manoeuvre is not less than 3.0 s and not more than:
 - (i) 5.0 seconds with an automatic initiation,
 - (ii) 7.0 seconds with an initiation by a second deliberate action

whatever is appropriate.

(f) For systems, with an initiation of the lane change manoeuvre by a second deliberate action, the measured time between the start of the lane change procedure and the second deliberate action is not more than 4.0 seconds.

(fg) The system provides an information to the driver to indicate that the lane change procedure is on-going,

(gh) The lane change manoeuvre is completed in less than 5 s for M_1 , N_1 vehicle categories and less than 10 s for M_2 , M_3 , N_2 , N_3 vehicle categories,

(hi) ACSF of Category B1 automatically resumes after the lane change procedure is completed, and

(ij) The direction indicator is deactivated not before the end of the lane change manoeuvre and no later than 0.5 seconds after B1 has resumed, in case the lateral movement is initiated automatically."

Paragraph 3.5.4.1., amend to read:

"3.5.4.1. The test vehicle shall be driven in a lane of a straight test track, which has at least two lanes in the same direction of travel, with road markings on each side of the lanes.

The vehicle speed shall be: $V_{min} + 10\text{km/h}$.

The ACSF of Category C shall be activated (standby mode) and another vehicle shall approach from the rear in order to enable the system as specified in paragraph 5.6.4.8.3. above.

The approaching vehicle shall then pass the vehicle under test entirely.

A Lane Change Procedure shall then be initiated by the driver.

The test shall be repeated for each of the following conditions, which shall occur before the lane change manoeuvre has started:

- (a) The system is overridden by the driver;
- (b) The system is switched off by the driver;
- (c) The vehicle speed is reduced to: $V_{min} - 10\text{ km/h}$;
- (d) The driver has removed his hands from the steering control and the hands-off warning has been initiated;
- (e) The direction indicator lamps are manually deactivated by the driver;
- (f) The lane change manoeuvre has not commenced within 5.0 s following the initiation of the lane change procedure. (e.g., another vehicle is driving in the adjacent lane in a critical situation as described in 5.6.4.7.) or 7.0 seconds if initiated by a second deliberate action.
- (g) **For a system with an initiation of the lane change manoeuvre by a second deliberate action, the driver has performed the second deliberate action more than 4.0 seconds after the initiation of the lane change procedure."**

Paragraph 3.5.7.1.1., amend to read:

"3.5.7.1.1. Following a new engine start /run cycle performed by the driver, the test vehicle shall be driven in a lane of a straight test track, which has at least two lanes in the same direction of travel, with road markings on each side of the lanes.

The ACSF of Category C shall not be activated (off mode) and another vehicle shall approach from the rear and the approaching vehicle shall pass the vehicle entirely.

~~The direction indicator used to initiate a lane change procedure shall be activated by the driver for a period greater than 5 seconds.~~

A lane change procedure and manoeuvre shall then be initiated by the driver with the appropriate deliberate action(s)."

Paragraph 3.5.7.2.1., amend to read:

"3.5.7.2.1. Following a new engine start / run cycle performed by the driver, the test vehicle shall be driven in a lane of a straight test track, which has at least two lanes in the same direction of travel, with road markings on each side of the lanes.

The ACSF of Category C shall be manually activated (standby mode).

A lane change procedure **and manoeuvre** shall then be initiated by the driver **with the appropriate deliberate action(s).**"

Paragraph 3.5.7.3.1., amend to read:

"3.5.7.3.1. Following the completion of the test phase 2, another vehicle shall approach from the rear on the adjacent lane in order to enable the system as specified in paragraph 5.6.4.8.3.

The approaching vehicle shall be a type approved high volume series production vehicle.

The distance between the rear end of the test vehicle and the front end of the approaching vehicle shall be measured (e.g. with a differential GPS), and the value when the system detects the approaching vehicle be recorded.

After the rear coming vehicle has entirely passed the vehicle under test, a lane change procedure **and manoeuvre** shall be initiated by the driver **with the appropriate deliberate action(s).**"

II. Justification

A. Introduction

1. This proposal does not at all change the current requirements for ACSF of Category C (ACSF-C) with the one-step HMI.
2. The proposal is to insert provisions for ACSF-C with a two-step HMI, while keeping unchanged the main performance of the system e.g. rear sensor range, critical situations, minimum distance and minimum operating speed, etc.

B. Proposal

Paragraph 5.6.4.6.4.

3. For the lane change function with one-step HMI, the lane change manoeuvre shall be initiated between the third and the fifth second after the initiation of the lane change procedure.
4. The lane change function with two-step HMI is a quite natural HMI, closer to manual lane change: the driver has full control on the timing of the two steps of a lane change, i.e. initiating the lane change procedure, then initiating the lateral movement, by two deliberate actions.
5. This permits an increase in the maximum time between the Lane Change Procedure and the Lane Change Manoeuvre.
6. So, it is proposed to initiate the lateral movement of the vehicle after the second deliberate action.
7. This second action shall be performed at the latest 4 seconds after the start of the lane change procedure. The lane change manoeuvre shall be initiated at the latest seven seconds after the initiation of the lane change procedure.
8. The driver will have to perform two different actions in a short time frame. Moreover, the driver should still continue to drive and be supervising the environment. That's why it is important that the control for the second deliberate action shall be located close to the steering control area (e.g.: Push button on the steering wheel....).

Paragraph 5.6.4.6.7.

9. As the lane change function with two-step HMI is closer to a manual lane change, we propose to keep the possibility for this function to have an automatic or a manual deactivation of the direction indicator. This system is a "SAE level 2" system and a hands-on function. The manual lane change and the two-step HMI function proposed an optic and an acoustic signal provided by the turn indicator function.

Paragraph 5.6.4.6.8.1.

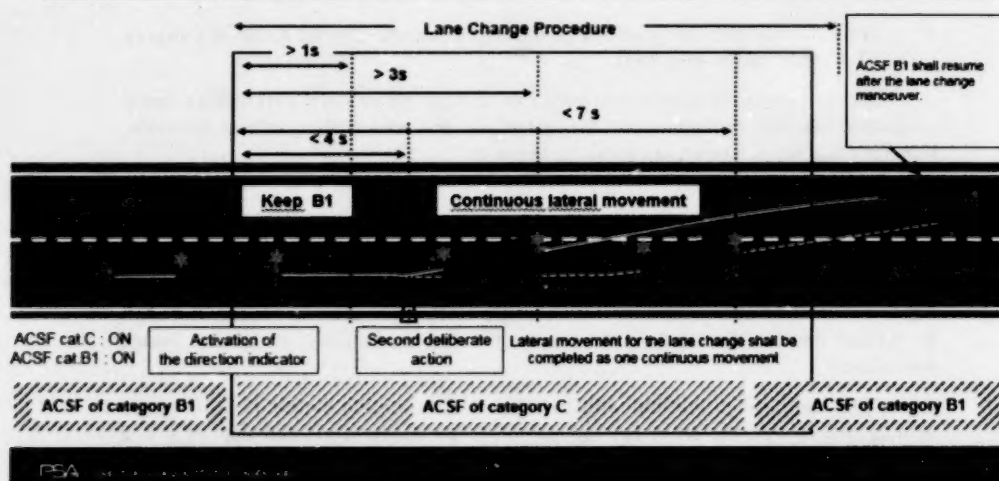
10. This paragraph describes the conditions that lead to an automatic suppression of the lane change procedure. For the lane change with two-step HMI, the lane change manoeuvre shall commence before the tenth second. Otherwise, the lane change procedure shall be suppressed and the ACSF of Category B1 shall resume.

Annex 8:

The testing procedure is then adapted according to the above requirements.

Figure 1

Description of the two-step HMI lane change procedure

ACSF C – 2 Step HMI

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Item 10 of the provisional agenda

UN Regulation No. 79

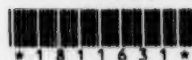
Proposal for a Supplement to UN Regulation No. 79 (Steering Equipment)**Submitted by the expert from the United Kingdom of Great Britain and Northern Ireland****

The text reproduced below was prepared by the expert from the United Kingdom of Great Britain and Northern Ireland proposing to introduce provisions in UN Regulation No. 79 (Steering equipment) for the approval of Remote Control Manoeuvring (RCM) systems. The modifications to the existing text of the Regulation are marked in bold.

* Formerly: **Working Party on Brakes and Running Gear (GRRF)**.

** In accordance with ECE/TRANS/274, para 52), with ECE/TRANS/WP.29/1139, para. 33 and with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-11631(E)



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I. Proposal

Insert a new paragraph 2.3.4.4., to read:

- "2.3.4.4. "Remote Control Manoeuvring (RCM)" means a function actuated by the driver that provides direct control on steering angle, acceleration, and deceleration for low speed manoeuvring. The actuation is made by remote control in close proximity to the vehicle."

Insert a new paragraph 2.3.4.18., to read:

- "2.3.4.18. "Specified maximum RCM operating range (S_{RCMmax})" means the maximum distance between the nearest point of the motor vehicle and the remote-control device up to which RCM is designed to operate."

Insert a new paragraph 5.6.5., to read:

- "5.6.5. Vehicles of category M₁G, N₁G, [N₂ with a maximum laden mass over 7,500kg], and N₃ may be equipped with RCM provided the system fulfils the following requirements:
- 5.6.5.1. The system shall be active only after a deliberate action of the driver and if the conditions for operation of the system are fulfilled (all associated functions – e.g. brakes, accelerator, steering, camera/radar/lidar are working properly).
- 5.6.5.2. A continuous actuation of a dedicated button/switch on the remote control device by the driver is required during the manoeuvre. Another button/switch on the remote control device may be used to control the manoeuvring of the vehicle.
- 5.6.5.3. Whenever the system becomes operational, this shall be indicated to the driver by an optical signal at least at the remote control device.
- 5.6.5.4. The system shall only operate until 5 km/h (+1 km/h tolerance).
- 5.6.5.5. At any time during a manoeuvre that the vehicle becomes stationary, the RCM function shall prevent the vehicle from rolling away.
- 5.6.5.6. If the continuous actuation is interrupted or the distance between vehicle and remote control device exceeds the specified maximum RCM operating range (S_{RCMmax}) or the signal between remote control and vehicle is lost, the vehicle shall stop immediately.
- 5.6.5.7. The specified maximum RCM operating range shall not exceed [6m] for vehicles of category M₁G and N₁G. For all other vehicles equipped with RCM, the maximum RCM operating range shall not exceed [15m].
- 5.6.5.8. The system shall be able to be deactivated by the driver at any time.
- 5.6.5.9. If a door or trunk of the vehicle is opened during the manoeuvre, the vehicle shall stop immediately and the RCM function shall be deactivated.
- 5.6.5.10. The system shall be designed to be protected against unauthorized activation or operation of the RCM systems and interventions into the system.
- 5.6.5.11. System information data
- 5.6.5.12. The Following data shall be provided together with the documentation package required in Annex 6 of this Regulation to the Technical Service at the time of type approval:

- 5.6.5.12.1. The value for the specified maximum RCM operating range (S_{RCMmax});
- 5.6.5.12.2. The conditions under which the system can be activated, i.e. when the conditions for operation of the system are fulfilled;
- 5.6.5.12.3. For RCM systems, the Manufacturer shall provide the technical authorities with an explanation of how the system is protected against unauthorized activation.
- 5.6.5.13. For vehicles of Category M₁G and N₁G equipped with RCM, the following requirements shall also apply:
 - 5.6.5.13.1. The RCM system shall be so designed that its activation can only be achieved provided the vehicle is not in any of the following locations:
 - (a) A public road/highway;
 - (b) A public car park;
 - (c) An area designated exclusively for use by pedestrians and/or pedal cyclists.

The system shall be capable of confirming that the vehicle is not located in any of the above locations whilst the RCM function is active and this shall be achieved by at least two independent technical means¹. If navigation maps are used for this purpose, the RCM function shall be disabled if the map data has not been updated in the previous 12 months.

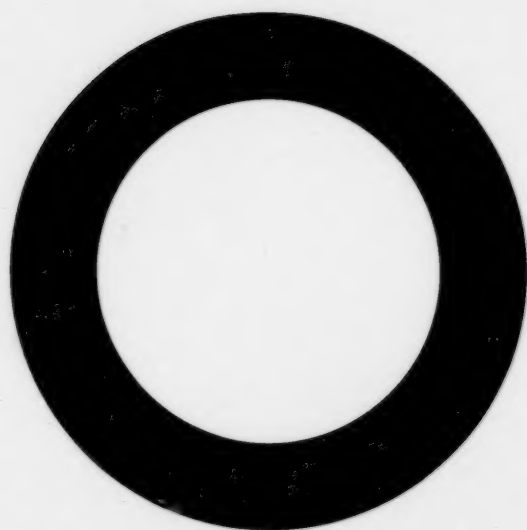
- 5.6.5.13.2. The vehicle shall be equipped with a means to detect an obstacle (e.g. vehicles, pedestrian) in the manoeuvring area and to bring the vehicle immediately to a stop to avoid a collision.
- 5.6.5.13.3. If the vehicle stops having detected an obstacle in the manoeuvring area, subsequent operation shall only be possible following confirmation from the driver. The vehicle shall respond to any subsequent objects detected in the manoeuvring area as prescribed in paragraph 5.6.5.13.2.
- 5.6.5.13.4. It shall only be possible to operate the system when drive is provided to at least one front axle and one rear axle simultaneously.
- 5.6.5.13.5. The vehicle shall detect if, while the RCM function is active, the vehicle enters any of the locations listed under paragraph 5.6.5.13.1. In such a case, the vehicle shall stop immediately and the RCM function shall be deactivated.
- 5.6.5.13.6. The system shall only operate for a maximum total distance travelled of 100m. This distance may be reset if there is no input on the remote control device for at least 1 minute or if the system has been deactivated and a time period of at least 1 minute has elapsed. The distance shall be subsequently measured from the next point at which the RCM function is operated.
- 5.6.5.13.7. The driver shall be issued with a warning signal when the total distance travelled is 75m (+5m tolerance). This shall be fulfilled by the provision of an optical warning signal and either a haptic or acoustic warning signal at least at the remote control device.

¹ Two different types of map (e.g. navigation and topographical) supplied by two different suppliers are satisfactory for this requirement.

- 5.6.5.13.8. If the vehicle reaches or exceeds the maximum total distance travelled defined in paragraph 5.6.5.13.6., the vehicle shall stop immediately and the RCM function shall be deactivated. It shall not be possible to subsequently activate the RCM until a time period of at least 1 minute has elapsed. This shall be indicated to the driver at least at the remote control device."

II. Justification

1. Category G vehicles (defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3)) have specific characteristics that enable them to achieve traction on, and to traverse over, off-road terrain that would defeat and/or damage conventional road vehicles. The operation of vehicles under these conditions requires the driver to have a particular skill level beyond that of the conventional vehicle user. However, despite those skills, in some cases, situations present themselves for which it would be safer for the driver to be able to manoeuvre the vehicle from outside.
2. In addition, there are a number of commercial vehicle applications where it would be safer for the operator to remotely manoeuvre the vehicle from outside (e.g. asphalt spreading). In these scenarios, it is the responsibility of the professionally trained driver to check the area prior to using the system. Nevertheless, the requirements proposed here ensure a minimum level of safety whilst also aiming to harmonise systems coming to market.
3. This proposal seeks to permit remote manoeuvring capability for both commercial vehicles and vehicles designed to operate in an off-road location as confirmed throughout the whole period that the function is in use. For off-road vehicles, the use of the RCM function in any other environment must be suppressed by technical means that cannot be overridden by the vehicle user. The proposal is deliberately non-prescriptive about how the off-road environment is identified but if map data is used then an up to date map is required to ensure that the function does not become available on newly constructed roads, i.e. roads built on land formerly identified as off-road by mapping data.



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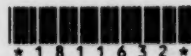
Advanced Emergency Braking Systems**Proposal for a new series of amendments to UN Regulation
No. 131 (Advanced Emergency Braking Systems)****Submitted by the expert from Germany****

The text reproduced below was prepared by the expert from Germany with the aim to clarify the Advanced Emergency Braking Systems (AEBS) requirements over the whole operation speed range, as well as to increase the performance requirements for AEBS and modify the conditions for a deactivation of the AEBS function by the driver. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters.

* Formerly: Working Party on Brakes and Running Gear (GRRF).

** In accordance with ECE/TRANS/274, para 52), with ECE/TRANS/WP.29/1139, para. 33 and with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-11632(E)



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I. Proposal

UN Regulation No. 131, main text (without annexes), amend to read:

"UN Regulation No. 131

Uniform provisions concerning the approval of motor vehicles with regard to the Advanced Emergency Braking Systems (AEBS)

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Introduction (for information)

The intention of this UN Regulation is to establish uniform provisions for advanced emergency braking systems (AEBS) fitted to motor vehicles of the categories M₂, M₃, N₂ and N₃¹ primarily used under highway conditions.

While, in general, those vehicle categories will benefit from the fitment of an advanced emergency braking system, there are sub-groups where the benefit is rather uncertain because they are primarily used in other conditions than highway conditions (e.g. buses with standing passengers i.e. Classes I, II and A¹). Regardless from the benefit, there are other sub-groups where the installation of AEBS would be technically difficult (e.g. position of the sensor on vehicles of category G and special purpose vehicles, etc.).

~~In addition, systems intended for vehicles not equipped with a pneumatic rear axle suspension require the integration of advanced sensor technology to take into account the variation of the pitch angle of the vehicle. Contracting Parties wishing to apply this Regulation to these vehicles should provide adequate time for this.~~

The system shall automatically detect a potential forward collision, provide the driver with a warning and activate the vehicle braking system to decelerate the vehicle with the purpose of avoiding or mitigating the severity of a collision in the event that the driver does not respond **sufficiently quickly** to the warning.

The system shall only operate in driving situations where braking will avoid or mitigate the severity of an accident, and shall take no action in normal driving situations.

In the case of a failure in the system, the safe operation of the vehicle shall not be endangered.

The system shall provide as a minimum an acoustic or haptic warning, which may also be a sharp deceleration, so that an inattentive driver is made aware of a critical situation.

During any action taken by the system (the warning and emergency braking phases), the driver can, at any time through a conscious action, e.g. by a steering action or an accelerator kick-down, take control and override the system. **The system shall be able to distinguish conscious actions from non-conscious actions, e.g. driver movement that is a reaction to haptic warnings and / or the emergency braking phase.**

The Regulation cannot include all the traffic conditions and infrastructure features in the type-approval process. Actual conditions and features in the real world should not result in false warnings or false braking to the extent that they encourage the driver to ~~switch the system off~~ ignore warnings or endanger other traffic participants.

1. Scope and purpose

This UN Regulation applies to the approval of vehicles of category M₂, N₂, M₃ and N₃¹ with regard to an on-board system to avoid or mitigate the severity of a rear-end in lane collision.

¹ As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.6, para. 2.

2. Definitions

- 2.1. "Advanced Emergency Braking System (AEBS)" means a system which can automatically detect a potential forward collision and activate the vehicle braking system to decelerate the vehicle with the purpose of avoiding or mitigating a collision.
- 2.2. "Vehicle type with regard to its Advanced Emergency Braking System" means a category of vehicles which do not differ in such essential respects as:
- (a) The manufacturer's trade name or mark;
 - (b) Vehicle features which significantly influence the performances of the Advanced Emergency Braking System;
 - (c) The type and design of the Advanced Emergency Braking System.
- 2.3. "Subject vehicle" means the vehicle being tested.
- 2.4. "Target" means a target that will suffer minimum damage and cause minimum damage to the subject vehicle in the event of a collision. It shall be representative for a high volume series production passenger compact car of category M₁ AA saloon¹ or in the case of a soft target an object representative of such a vehicle in terms of its detection characteristics applicable to the sensor system of the AEBS under test, such as the target object as specified in ISO [WD] 19206-3.
- 2.5. "Moving target" means a target travelling at a constant speed in the same direction and in the centre of the same lane of travel as the subject vehicle.
- 2.6. "Stationary target" means a target at standstill facing the same direction and positioned on the centre of the same test lane of travel as the subject vehicle.
- ~~2.7. "Soft target" means a target that will suffer minimum damage and cause minimum damage to the subject vehicle in the event of a collision.~~
- 2.7. "Collision warning phase" means the phase directly preceding the emergency braking phase, during which the AEBS warns the driver of a potential forward collision.
- 2.8. "Emergency braking phase" means the phase starting when the AEBS emits a braking demand for at least 4 m/s² deceleration to the service braking system of the vehicle.
- 2.9. "Common space" means an area on which two or more information functions (e.g. symbol) may be displayed, but not simultaneously.
- 2.10. "Self-check" means an integrated function that checks for a system failure on a semi-continuous basis at least while the system is active.
- 2.11. "Time to collision (TTC)" means the value of time obtained by dividing the distance between the subject vehicle and the target by the relative speed of the subject vehicle and the target, at an instant in time.
- 2.12. "Reaction time" means the time between the warning signal is given and actuation of the brake pedal by the driver. The value for the reaction time shall be [1.4] seconds.
- 2.13. "Normal driving brake application" means the brake control behaviour that typical drivers perform in regular traffic. It shall be assumed that

typical braking behaviour is a brake application of [3] m/s², applied within [1] second.

- 2.14. *"Emergency brake application"* means the brake control behaviour that typical drivers perform in response to a forward collision warning. It is expected that drivers fully apply the brake up to the vehicle's deceleration limit after the reaction time has elapsed.
- 2.15. *"Dry road"* means a road surface offering a peak braking coefficient of no less than 0.9.
- 2.16. *"Wet road"* means a wet road surface offering a peak braking coefficient of no less than 0.4.
- 2.17. *"Relative Impact Speed"* means the relative speed between subject vehicle and target at the time of impact.
- 2.18. *"Impact Speed"* means the speed of the subject vehicle at the time of impact.
- 2.19. *"Filtered vehicle deceleration"* means the vehicle deceleration signal, filtered with a 6-pole phaseless butterworth filter and a cut-off frequency of 5 Hz.

3. Application for approval

- 3.1. The application for approval of a vehicle type with regard to the Advanced Emergency Braking System shall be submitted by the vehicle manufacturer or by his authorized representative.
- 3.2. It shall be accompanied by the documents mentioned below in triplicate:
 - 3.2.1. A description of the vehicle type with regard to the items mentioned in paragraph 2.2., together with a documentation package which gives access to the basic design of the AEBS and the means by which it is linked to other vehicle systems or by which it directly controls output variables. The numbers and/or symbols identifying the vehicle type shall be specified.
- 3.3. A vehicle representative of the vehicle type to be approved shall be submitted to the Technical Service conducting the approval tests.

4. Approval

- 4.1. If the vehicle type submitted for approval pursuant to this Regulation meets the requirements of paragraph 5. below, approval of that vehicle shall be granted.
- 4.2. An approval number shall be assigned to each type approved; its first two digits (at present 0402 corresponding to the 0402 series of amendments) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same number to the same vehicle type equipped with another type of AEBS, or to another vehicle type.
- 4.3. Notice of approval or of refusal or withdrawal of approval pursuant to this Regulation shall be communicated to the Parties to the Agreement which

apply this Regulation by means of a form conforming to the model in Annex 1 and documentation supplied by the applicant being in a format not exceeding A4 (210 x 297 mm), or folded to that format, and on an appropriate scale or electronic format.

- 4.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation, an international approval mark conforming to the model described in Annex 2, consisting of:
 - 4.5.1. A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval;²
 - 4.5.2. The number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle prescribed in paragraph 4.5.1. above.
- 4.6. If the vehicle conforms to a vehicle type approved under one or more other Regulations, annexed to the Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 4.5.1. above need not be repeated; in such a case, the Regulation and approval numbers and the additional symbols shall be placed in vertical columns to the right of the symbol prescribed in paragraph 4.5.1. above.
- 4.7. The approval mark shall be clearly legible and be indelible.
- 4.8. The approval mark shall be placed close to or on the vehicle data plate.

5. Specifications

- 5.1. General
 - 5.1.1. Any vehicle fitted with an AEBS complying with the definition of paragraph 2.1. above shall meet the performance requirements contained in paragraphs 5.1. to 5.6.2. of this Regulation and shall be equipped with an anti-lock braking function in accordance with the performance requirements of Annex 13 to UN Regulation No. 13.
 - 5.1.2. The effectiveness of the AEBS shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by compliance with the 05 series of amendments to UN Regulation No. 10.
 - 5.1.3. Conformity with the safety aspects of complex electronic control systems shall be shown by meeting the requirements of Annex 4 3.
- 5.2. Performance requirements
 - 5.2.1. The system shall provide the driver with appropriate warning(s) as below:
 - 5.2.1.1. A collision warning when the AEBS has detected the possibility of a collision with a preceding vehicle of category M, N or O in the same lane which is travelling at a slower speed, has slowed to a halt or is stationary having not

² The distinguishing numbers of the Contracting Parties to the 1958 Agreement are reproduced in Annex 3 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), document ECE/TRANS/WP.29/78/Rev.6 - www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

being identified as moving. The warning shall be as specified in paragraph 5.5.4. ~~above~~ below.

The timing of the warning signals shall be such that they provide the possibility for the driver to react to the risk of collision and take control of the situation, and shall also avoid nuisance for the driver by too early or too frequent warnings.

This shall be tested in accordance with the provisions of paragraphs 6.5.2. and 6.6.2. of this Regulation.

- 5.2.1.1.1. The warning shall be given at the latest in such a timely manner that an emergency brake application according to paragraph 2.14. (taking also into account the reaction time according to paragraph 2.12.) would lead to the vehicle avoiding collisions on constantly moving or stationary targets which are also centred in the same lane and facing in the same direction.
- 5.2.1.1.2. The warning shall be given at the earliest in conditions when a collision in the conditions as specified in paragraph 5.2.1.1.1. would not be avoided with normal driving brake application according to paragraph 2.13.
- 5.2.1.1.3. A warning may not be given in cases where the warning is necessary while typical drivers are still in full control of the situation, namely when the requirements of paragraphs 5.2.1.1.1. and 5.2.1.1.2. contradict. This is expected to occur in the low speed range.
- 5.2.1.2. A failure warning when there is a failure in the AEBS that prevents the requirements of this Regulation of being met. The warning shall be as specified in paragraph 5.5.4. below.
- 5.2.1.2.1. There shall not be an appreciable time interval between each AEBS self-check, and subsequently there shall not be an appreciable delay in illuminating the warning signal, in the case of an electrically detectable failure.
- 5.2.1.2.2. Failures due to temporary sensor blocking, for instance due to a mounted snow-plough, shall be detected after a driving time of maximum [300] seconds.
- 5.2.1.3. A deactivation warning, if the vehicle is equipped with a means to manually deactivate the AEBS, shall be given when the system is deactivated. This shall be as specified in paragraph 5.4.2. below.
- 5.2.2. The AEBS shall avoid collisions with moving or stationary vehicles up to speeds as specified in paragraph 5.2.2.2., and mitigate collisions as specified in paragraph 5.2.2.3.

The AEBS shall reduce the impact speed in situations with decelerating vehicles as specified in paragraph 5.2.2.4.

This shall be tested in accordance with paragraphs 6.5. and 6.6. of this Regulation.
- 5.2.2.1. The emergency braking shall be activated at the earliest in conditions when an accident would not be avoided by normal driver brake application as specified in paragraph 2.13.

- 5.2.2.2. The emergency braking function shall be capable of avoiding collisions with stationary or constant moving targets, without any required driver activity at relative speeds up to [70] km/h on dry roads and [40] km/h on wet roads.
- 5.2.2.3. The emergency braking function shall be able to mitigate collisions with stationary or constant moving vehicles up to the maximum vehicle design speed, with a relative impact speed as function of initial relative speed between the vehicles $v_{0,rel}$, calculated by

$$v_{impact,rel} = \sqrt{v_{0,rel}^2 - 2 \left(t_{tc,Brake} - \frac{1}{2} t_{increase} \right) \cdot v_{0,rel} \cdot a_{max}},$$

using the following values, as observed during verification of the respective conditions in paragraph 5.2.2.2:

- maximum possible deceleration a_{max} in m/s^2 , identified after applying a floating average filter with a time constant of 1 s or a similar filter,
- automatic brake activation TTC $t_{tc,Brake}$ in s, calculated using the TTC $t_{tc,A}$ at which the filtered vehicle deceleration crosses $4 m/s^2$, the relative vehicle speed at which the filtered vehicle deceleration crosses $4 m/s^2$ v_A and the initial relative speed $v_{0,rel}$, according to the equation $t_{tc,Brake} = t_{tc,A} \cdot v_{0,rel} / v_A$,
- brake deceleration increase time $t_{increase}$, calculated using the time t_A at which the filtered vehicle deceleration crosses $4 m/s^2$ and the time $t_{a,max}$ at which the maximum deceleration is reached, according to the equation $t_{increase} = \frac{a_{max} \cdot (t_{a,max} - t_A)}{a_{max} - 4 m/s^2}$.

- 5.2.2.4. The emergency braking function shall avoid or mitigate collisions with decelerating targets by automatic brake application, using the value a_{max} as defined in paragraph 5.2.2.3., when an imminent collision is detected.

- 5.2.3. The system shall be active at least within the vehicle speed range of 15 km/h up to the maximum design speed of the vehicle, and at all vehicle load conditions, unless manually deactivated as per paragraph 5.4. below.

- 5.2.4. The system shall be designed to minimize the generation of collision warning signals and to avoid autonomous braking in situations where the driver would not recognize an impending forward collision. This shall be demonstrated in accordance with paragraph 6.9. of this Regulation.

- 5.3. Interruption by the driver

- 5.3.1. The AEBS may provide the means for the driver to interrupt the collision warning phase. However, when a vehicle braking system is used to provide a haptic warning, the system shall provide the driver with a means to interrupt the warning braking.

- 5.3.2. The AEBS shall provide the means for the driver to interrupt the emergency braking phase.

- 5.3.3. In both cases above, this interruption may be initiated by any positive action (e.g. kick-down) that indicates that the driver is aware of the emergency situation. The vehicle manufacturer shall provide a list of these positive actions to the technical service at the time of type approval and it shall be annexed to the test report.

- 5.3.4. The vehicle manufacturer shall demonstrate to the satisfaction of the technical service that natural driver movements generated purely by brake activations shall not lead to an interruption of the emergency braking phase.**
- 5.4. When a vehicle is equipped with a means to deactivate the AEBS function, the following conditions shall apply ~~as appropriate~~:
- 5.4.1. The AEBS function shall be automatically ~~reinstated~~–reactivated at the initiation of each new ignition cycle.
- 5.4.2. The AEBS function shall be automatically and instantaneously reactivated if the vehicle speed exceeds 30 km/h.**
- 5.4.3. The deactivation of the AEBS function shall not be possible at vehicle speeds greater than 30 km/h.**
- 5.4.4. A constant optical warning signal shall inform the driver that the AEBS function has been deactivated. The yellow warning signal specified in paragraph 5.5.4. below may be used for this purpose.
- 5.5. Warning indication
- 5.5.1. The collision warning referred to in paragraph 5.2.1.1. above shall be provided by at least two modes selected from acoustic, haptic or optical.
This shall be tested in accordance with the provisions of paragraphs 6.5.2. and 6.6.2. of this Regulation
- 5.5.2. A description of the warning indication and the sequence in which the collision warning signals are presented to the driver shall be provided by the vehicle manufacturer at the time of type-approval and recorded in the test report.
- 5.5.3. Where an optical means is used as part of the collision warning, the optical signal may be the flashing of the failure warning signal specified in paragraph 5.5.4. below.
- 5.5.4. The failure warning referred to in paragraph 5.2.1.2. above shall be a constant yellow optical warning signal.
- 5.5.5. Each AEBS optical warning signal shall be activated either when the ignition (start) switch is turned to the "on" (run) position or when the ignition (start) switch is in a position between the "on" (run) and "start" that is designated by the manufacturer as a check position (initial system (power-on)). This requirement does not apply to warning signals shown in a common space.
- 5.5.6. The optical warning signals shall be visible even by daylight; the satisfactory condition of the signals must be easily verifiable by the driver from the driver's seat.
- 5.5.7. When the driver is provided with an optical warning signal to indicate that the AEBS is temporarily not available, for example due to inclement weather conditions, the signal shall be constant and yellow in colour. The failure warning signal specified in paragraph 5.5.4. above may be used for this purpose.
- 5.6. Provisions for the periodic technical inspection

- 5.6.1. At a periodic technical inspection, it shall be possible to confirm the correct operational status of the AEBS by a visible observation of the failure warning signal status, following a "power-ON" and any bulb check.

In the case of the failure warning signal being in a common space, the common space must be observed to be functional prior to the failure warning signal status check.

- 5.6.2. At the time of type approval, the means to protect against simple unauthorized modification of the operation of the failure warning signal chosen by the manufacturer shall be confidentially outlined.

Alternatively, this protection requirement is fulfilled when a secondary means of checking the correct operational status of the AEBS is available.

6. Test procedure

6.1. General provisions

Vehicles fitted with AEBS shall fulfil the following test requirements.

6.2. Test conditions

- 6.2.1. The test shall be performed on a flat, dry concrete or asphalt surface affording good adhesion.

- 6.2.2. The ambient temperature shall be between 0 °C and 45 °C.

- 6.2.3. The horizontal visibility range shall allow the target to be observed throughout the test.

- 6.2.4. The tests shall be performed when there is no wind liable to affect the results.

6.3. Vehicle conditions

6.3.1. Test weight

During the test, the vehicle shall be loaded to its technically permissible maximum mass. If this is deemed justified, the technical service may additionally select a different load condition. No alteration shall be made once the test procedure has begun.

6.4. Test targets

- 6.4.1. **The target used for the tests shall be a target as specified in paragraph 2.4.**

If this is deemed justified by the technical service, a real vehicle may be used for non-destructive tests.

- 6.4.2. Details that enable the target(s) to be specifically identified and reproduced shall be recorded in the vehicle type approval documentation.

6.5. Warning and activation test with a stationary target

- 6.5.1. The subject vehicle shall approach the stationary target in a straight line for at least two seconds prior to the functional part of the test with a subject vehicle **centreline** to target centreline offset of not more than 0.5 m.

The functional part of the test shall start when the subject vehicle is travelling at the test speed of 80 ± 2 km/h and is at a distance of at least 120 m from the target corresponding to a travel time of 6 s at the selected test speed.

From the start of the functional part until the point of collision there shall be no adjustment to any control of the subject vehicle by the driver other than slight adjustments to the steering control to counteract any drifting.

Tests shall be performed at the vehicle maximum design speed, at the avoidance speed as specified in paragraph 5.2.2.2. and at each of the following speeds that is not greater than the vehicle maximum design speed: 20, 40, 60, 80, 100 km/h.

Where this is deemed justified, the technical service may select additional test speeds between 15 km/h and the vehicle maximum design speed.

- 6.5.2. The timing for the collision warning modes referred to in paragraph 5.5.1. above shall comply with the **provisions as specified in paragraphs 5.2.1.1.1., 5.2.1.1.2. under consideration of paragraph 5.2.1.1.3.**

- 6.5.2.1. At least one warning mode shall be provided ~~no later than at the latest when the emergency braking phase is activated.~~

- 6.5.3. **For relative speeds not exceeding the values as specified in paragraph 5.2.2.2., a collision shall be avoided including a tolerance of 5 km/h.**

For greater values, the relative impact speed shall be as specified in paragraph 5.2.2.3., including a tolerance of 10 km/h.

- ~~6.4.2.3. Any speed reduction during the warning phase shall not exceed either 15 km/h or 30 per cent of the total subject vehicle speed reduction, whichever is higher.~~

- ~~6.4.3. The collision warning phase shall be followed by the emergency braking phase.~~

- ~~6.4.4. The total speed reduction of the subject vehicle at the time of the impact with the stationary target shall be not less than the value specified in Table 1, column D of Annex 2.~~

- ~~6.4.5.6.5.4.~~ The emergency braking phase shall not start before a TTC equal to or less than 3.0 seconds **or as specified in paragraph 5.2.2.1., whatever is lower.**

Compliance shall be verified by either actual measurement during the test or using documentation provided by the vehicle manufacturer, as agreed between the Technical Service and the vehicle manufacturer.

- 6.6. Warning and activation test with a moving target

- 6.6.1. The subject vehicle and the moving target shall travel in a straight line, in the same direction, for at least two seconds prior to the functional part of the test, with a subject vehicle to target centreline offset of not more than 0.5m.

The functional part of the test shall start with the subject vehicle travelling at **at the test speed of 80 ± 2 km/h**, the moving target at **a speed of the value specified in Table 1, column H of Annex 3 13 km/h**, and a separation distance of at least 120 m between them.

From the start of the functional part of the test until the subject vehicle comes to a speed equal to that of the target there shall be no adjustment to any subject vehicle control by the driver other than slight steering adjustments to counteract any drifting.

Tests shall be performed at the vehicle maximum design speed and at each of the following speeds that is not greater than the vehicle maximum design speed: 40, 60, 80, 100 km/h.

Where this is deemed justified, the technical service may select additional test speeds between 15 km/h and the vehicle maximum design speed and other speeds of the moving target.

- 6.6.2. The timing for the collision warning modes referred to in paragraph 5.5.1. above shall comply with the provisions as specified in paragraphs 5.2.1.1.1., 5.2.1.1.2. under consideration of paragraph 5.2.1.1.3.
- 6.6.2.1. At least one haptic or acoustic warning mode shall be provided no later than at the latest when the emergency braking phase is activated..
- 6.6.3. For relative speeds not exceeding the values as specified in paragraph 5.2.2.2., a collision shall be avoided, including a tolerance of 5 km/h.
For greater values, the relative speed reduction shall be as specified in paragraph 5.2.2.3., including a tolerance of 10 km/h.
- ~~6.5.2.3. Any speed reduction during the warning phase shall not exceed either 15 km/h or 30 per cent of the total subject vehicle speed reduction, whichever is higher.~~
- 6.6.4. The emergency braking phase shall not start before a TTC equal to or less than 3.0 seconds or as specified in paragraph 5.2.2.1., whatever is lower.
Compliance shall be verified by either actual measurement during the test or using documentation provided by the vehicle manufacturer, as agreed between the Technical Service and the vehicle manufacturer.
- 6.7. Failure detection test
- 6.7.1. Simulate an electrical failure, for example by disconnecting the power source to any AEBS component or disconnecting any electrical connection between AEBS components. When simulating an AEBS failure, neither the electrical connections for the driver warning signal of paragraph 5.5.4. above nor the optional manual AEBS deactivation control of paragraph 5.4. shall be disconnected.
- 6.7.2. The failure warning signal mentioned in paragraph 5.5.4. above shall be activated and remain activated not later than 10 seconds after the vehicle has been driven at a speed greater than 15 km/h and be reactivated immediately after a subsequent ignition "off" ignition "on" cycle with the vehicle stationary as long as the simulated failure exists.
- 6.8. Deactivation test
- 6.8.1. For vehicles equipped with means to deactivate the AEBS, turn the ignition (start) switch to the "or" (run) position and deactivate the AEBS. The warning signal mentioned in paragraph 5.4.2. above shall be activated. Turn the ignition (start) switch to the "off" position. Again, turn the ignition (start) switch to the "on" (run) position and verify that the previously activated warning signal is not reactivated, thereby indicating that the AEBS has been reinstated as specified in paragraph 5.4.1. above. If the ignition system is activated by means of a "key", the above requirement shall be fulfilled without removing the key.

- 6.8.2. For vehicles equipped with means to deactivate the AEBS, turn the ignition (start) switch to the "on" (run) position and deactivate the AEBS. The warning signal mentioned in paragraph 5.4.4. above shall be activated. Accelerate the vehicle to a vehicle speed of greater than 30 km/h. The test is passed if the AEBS function is automatically reactivated and the warning signal mentioned in paragraph 5.4.2. above is automatically deactivated when the vehicle speed of 30 km/h is exceeded.
- 6.8.3. For vehicles equipped with means to deactivate the AEBS, turn the ignition (start) switch to the "on" (run) position. Drive the vehicle at a vehicle speed greater than 30 km/h and try to deactivate the AEBS function. The test is passed if the AEBS function is not deactivated after the deliberate action to deactivate the AEBS function has been carried out.
- 6.9. False reaction test
- 6.9.1. Two stationary vehicles, of category M₁ AA saloon, shall be positioned:
- (a) So as to face in the same direction of travel as the subject vehicle,
 - (b) With a distance of 4.5 m between them³,
 - (c) With the rear of each vehicle aligned with the other.
- 6.9.2. The subject vehicle shall travel for a distance of at least 60 m, at a constant speed of 50 ± 2 km/h to pass centrally between the two stationary vehicles. During the test there shall be no adjustment of any subject vehicle control other than slight steering adjustments to counteract any drifting.
- 6.9.3. The AEBS shall not provide a collision warning and shall not initiate the emergency braking phase.

7. Modification of vehicle type and extension of approval

- 7.1. Every modification of the vehicle type as defined in paragraph 2.2. above shall be notified to the Type Approval Authority which approved the vehicle type. The Type Approval Authority may then either:
- 7.1.1. Consider that the modifications made do not have an adverse effect on the conditions of the granting of the approval and grant an extension of approval;
 - 7.1.2. Consider that the modifications made affect the conditions of the granting of the approval and require further tests or additional checks before granting an extension of approval.
- 7.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 4.3. above to the Contracting Parties to the Agreement which apply this Regulation.

³ The point of reference of each stationary vehicle for establishing the distance between the two stationary vehicles, shall be determined in accordance with ISO 612-1978.

- 7.3. The Type Approval Authority shall inform the other Contracting Parties of the extension by means of the communication form which appears in Annex 1 to this Regulation. It shall assign a serial number to each extension, to be known as the extension number.

8. Conformity of production

- 8.1. The conformity of production procedures shall comply with those set out in the 1958 Agreement, Schedule 1 (E/ECE/TRANS/505/Rev.3), and meet the following requirements:
- 8.2. A vehicle approved pursuant to this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements of paragraph 5. above;
- 8.3. The Type Approval Authority which has granted approval may at any time verify the conformity of control methods applicable to each production unit. The normal frequency of such inspections shall be once every two years.

9. Penalties for non-conformity of production

- 9.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirements laid down in paragraph 8. above are not complied with.
- 9.2. If a Contracting Party withdraws an approval it had previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation by sending them a communication form conforming to the model in Annex 1 to this Regulation.

10. Production definitively discontinued

If the holder of the approval completely ceases to manufacture a type of vehicle approved in accordance with this Regulation, he shall so inform the Type Approval Authority which granted the approval, which in turn shall forthwith inform the other Contracting Parties to the Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

11. Names and addresses of the Technical Services responsible for conducting approval tests and of Type Approval Authorities

The Contracting Parties to the Agreement applying this Regulation shall communicate to the United Nations Secretariat the names and addresses of the Technical Services responsible for conducting approval tests and of the Type Approval Authorities which granted approval and to which forms certifying approval or extension or refusal or withdrawal of approval are to be sent.

12. Transitional provisions

- 12.1. As from the official date of entry into force of the ~~04~~02 series of amendments, no Contracting Party applying the ~~04~~02 series of amendments to this Regulation, shall refuse to grant type approvals in accordance with the 01 series of amendments of this Regulation.
- 12.2. As from the date of entry into force of the ~~04~~02 series of amendments to this Regulation, Contracting Parties applying this Regulation may continue granting type approvals and extensions of type approvals to the ~~00~~01 series of amendments to this Regulation.
- In accordance with Article 12 of the 1958 Agreement, Type Approvals may be granted according to the 00 or 01 series of amendments (former versions). Contracting Parties shall notify to the Secretariat General which version they apply. In the absence of notification of Contracting Parties to the United Nations Secretary-General, Contracting Parties will be considered to apply the ~~04~~02 series.
- 12.3. As from the date of entry into force of the ~~04~~ 02 series of amendments, no Contracting Party applying this Regulation shall refuse national or regional type approval of a vehicle type approved to the 02 series of amendments to this Regulation.
- 12.4. Until 1 January 2021, no Contracting Party applying this Regulation shall refuse national or regional type approval of a vehicle type approved to the 01 series of amendments to this Regulation.
- 12.5. As from 1 January 2021, Contracting Parties applying the ~~04~~ 02 series of amendments to this Regulation shall not be obliged to accept, for the purpose of national or regional type approval, a vehicle type approved to the ~~00~~ 01 series of amendments to this Regulation."

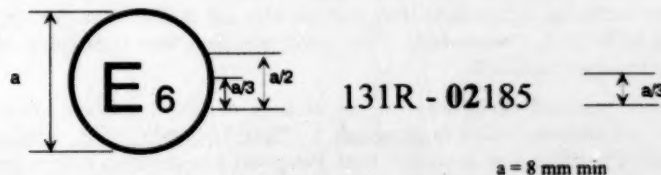
Annex 1, remains unchanged.

Annex 2, amend to read:

"Annex 2

Arrangements of approval marks

(See paragraphs 4.4. to 4.4.2. of this Regulation)



The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in Belgium (E 6) pursuant to Regulation No. 131. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of the 02 series of amendments to the Regulation No. 131"

Annex 3, shall be deleted.

Annex 4 (former), renumber as Annex 3 (new).

II. Justification

1. The current text of UN Regulation No. 131 is written in a way that the technical requirements for AEBS functions (e.g. necessary speed reduction, timing for forward collision signals, etc) are provided in the test section and only for the test case, a collision test with the subject vehicle travelling at $80 \text{ km/h} \pm 2 \text{ km/h}$ and the target being stationary or travelling at 13 km/h or 68 km/h , depending on vehicle class. The Regulation contains a mandatory warning phase in which only a limited speed reduction shall be achieved.

2. While this structure defines the conditions at the test case quite well, it hinders the performance at other speeds: due to the lack of specific requirements, type approval authorities typically require the mandatory warning phase with limited speed reduction for the whole speed range, and typically require it to have a duration of 1.4 seconds.

3. At lower travelling speeds, typically below 50 km/h for heavy vehicles, a forward collision warning with the aim to alert the driver of an imminent collision needs to be activated so early that it will occur during perfectly normal driving conditions. On the other hand, collisions involving a strong deceleration of the preceding vehicle escalate typically so quickly that no time should be wasted before activation of the AEBS emergency braking function.

4. To solve this situation, this proposal a) deletes in particular the requirement which limits the speed reduction during the warning phase and b) defines a time range for the warning function which takes into account that a warning is not effective for avoiding collisions at lower speeds (paragraphs 5.2.1., specifically 5.2.1.1.1. to 5.2.1.1.3.).

5. This proposal also introduces specific requirements for the achievable speed reduction for the cases of dry roads and wet roads. It defines an equation that allows to calculate the relative impact speed for cases where an avoidance is not possible (e.g. which are above the thresholds for required speed reduction). These modifications can be found in paragraph 5.2.2.. The equation shown in paragraph 5.2.2.3. describes the possible speed reduction for a given brake activation Time To Collision (TTC), given brake deceleration and given initial speed. The addition of half the brake deceleration increase time approximates the exact solution which would require numeric integration. To account for this approximation, a tolerance of 10 km/h should be taken into account.

6. UN Regulation No. 131 contains speed reduction requirements that current AEBS systems exceed by far, especially on stationary targets. Driving experiments show that current heavy goods vehicles under good conditions (e.g. on dry roads) are capable of avoiding collisions with stationary targets up to travelling speeds of more than 70 km/h . This performance can also be verified by calculations. On wet roads which offer a lower peak braking coefficient, calculations show that vehicles are capable of mitigating such collisions up to 40 km/h . Consequently, these speed reductions have been introduced as requirements in paragraph 5.2.2.2.

7. A major proposed modification in the structure of UN Regulation 131 is the definition of requirements (only) in paragraph 5 ("Specifications"), while paragraph 6 ("Test procedure") defines how to execute tests. Paragraph 6 as proposed defines generic performance tests which can be properly carried out at different speeds. Speeds between 20 and 100 km/h (if possible for the respective vehicle) and additionally at maximum vehicle design speed shall be tested, however the technical service is now allowed to perform tests

at different speeds. The load condition of the subject vehicle has been fixed to be maximum permissible vehicle mass.

8. A new requirement is introduced that requires provisions not allowing AEBS to be overruled by unconscious movement, e.g. by "falling" into the accelerator pedal (see paragraph 5.3.4).

9. A justification for the changes to the AEBS deactivation function has been provided already in ECE/TRANS/WP.29/GRRF/2017/24, for the introduction of sensor-blocking tests (paragraph 5.2.1.2.2.) in GRRF-86-32. It is anticipated that the changes to warning timing (effectively removing mandatory warnings for city speeds) and to the limitation of speed reduction in the warning phase will lead to fewer false warnings in cities and, consequently, there should be no technical challenges that would require a deactivation of the AEBS function for the complex traffic situations in cities (as it was referred to in GRRF-85-21 (third bullet point)). While GRRF-86-32 introduced provisions for detecting sensor blocking, it is anticipated that it will be more beneficial to address this problem by exempting the relevant vehicles by national legislation from the requirement to use UN Regulation No. 131.

10. Necessary definitions have been added, the introduction text has been modified and transitional provisions have been introduced that would make these changes effective by 1 January 2021.

**Economic and Social Council**

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16 July 2018

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Economic Commission for Europe**Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Automated/Autonomous and Connected Vehicles*****First session**

Geneva, 25-28 September 2018

Item 14 (a) of the provisional agenda

**Remaining activities from the former Working Party
on Brake and Running Gear (handover period):**

Tyres

**Proposal for a Supplement to UN Regulation No. 117 (Tyres,
rolling resistance, rolling noise and wet grip)**

**Submitted by the experts from the European Tyre and Rim Technical
Organisation****

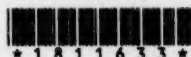
The text reproduced below was prepared by the experts from the European Tyre and Rim Technical Organisation (ETRTO) to amend UN Regulation No. 117. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters.

I. Proposal

Paragraph 2.18., amend to read:

-
- * Formerly: **Working Party on Brakes and Running Gear (GRRF)**.
 - ** In accordance with ECE/TRANS/274, para 52, with ECE/TRANS/WP.29/1139, para. 33 and with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-11633(E)



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"2.18. "Standard Reference Test Tyre (SRTT)" means a tyre that is produced, controlled and stored in accordance with the American Society for Testing and Materials (ASTM) standards

- (a) ~~E1136-93 (2003)~~ E1136 – 17 for the size P195/75R14
- (b) ~~F2872 (2011)~~ F2872 – 16 for the size 225/75 R 16 C
- (c) ~~F2871 (2011)~~ F2871 – 16 for the size 245/70R19.5
- (d) ~~F2870 (2011)~~ F2870 – 16 for the size 315/70R22.5."

Paragraph 6.4.1.1., amend the table to read:

Class of tyre	Snow grip index (brake on snow method) ^(a)		Snow grip index (spin traction method) ^(b)	Snow grip index (acceleration method) ^(c)
	Ref. = ~~C1~~ – SRTT 14	Ref. = ~~C2~~ – SRTT 16C	Ref. = ~~C1~~ – SRTT 14	Ref. = ~~C3N~~ – SRTT 19.5 Ref. = ~~C3W~~ – SRTT 22.5
C1	1.07	No	1.10	No
C2	No	1.02	1.10	No
C3	No	No	No	1.25

Annex 5, Paragraph 2.12., amend to read:

"2.12. "SRTT14" means the ASTM ~~E 1136-93 (Reapproved 2003)~~E1136 – 17, Standard Specification for a Radial Standard Reference Test Tire P195/75R14."

Annex 5, Paragraph 2.13., amend to read:

"2.13. "SRTT16" means the ASTM ~~F 2493-08~~F2493 - 18, Standard Specification for a Radial Standard Reference Test Tire P225/60R16."

Annex 6, Table 1, amend to read:

"Table 1
Test Speeds (in km/h)

Tyre Class	C1	C2 and C3	C3	
Load index	All	LI ≤ 121	LI > 121	
Speed symbol	All	All	J (100 km/h) and lower ~~or tyres not marked with speed symbol~~	K (110 km/h) and higher
Speed	80	80	60	80

Annex 6, Table 2, amend to read:

"Table 2
Test loads and inflation pressures

Tyre Class	C1 ^(a)		C2, C3
	Standard load	Reinforced or extra load	
Load - % of maximum load capacity	80	80	85 ^(ba) (% of single load)
Inflation pressure kPa	210	250	Test Inflation pressure marked on sidewall as required by UN Regulation No. 54. Corresponding to maximum load capacity for single application ^(ca)

Note: The inflation pressure shall be capped with the accuracy specified in paragraph 4. of Appendix I to this annex.

^(a) For those passenger car tyres belonging to categories which are not shown in ISO 4000-1:2010, the inflation pressure shall be the inflation pressure recommended by the tyre manufacturer, corresponding to the maximum tyre load capacity, reduced by 30 kPa.

^(ba) As a percentage of single load, or 85 per cent of maximum load capacity in single operation as indicated by the load capacity index for single application specified in applicable tyre standards manuals if not marked on tyre.

^(ca) Inflation pressure marked on sidewall, or if not marked on sidewall, as specified in applicable tyre standards manuals corresponding to maximum load capacity for single application.

Annex 7,

Paragraph 4.1., shall be deleted.

Paragraphs 4.2. to 4.10. (former), shall be renumbered as paragraphs 4.1. to 4.9.

Paragraph 4.7. (former), amend to read:

"4.7.6. Acceleration on snow test procedure for snow grip index of Classes C3N and C3W"

II. Justification

1. The amendments to the Standard Reference Test Tyre (SRTT) denominations are needed to align what was reported in this UN Regulation with the latest approved versions of such standard Specifications because it is practically impossible to procure an earlier version (because it is not produced anymore) and keeping the year reference ensures that UN keeps control on the version/performances.

2. The amendments to paragraph 6.4.1.1. and Annex 7 are proposed to remove the discrimination between the two Class C3 tyres that may create some problems of fitment with specific vehicles, given the fact that in any case coefficients and performances are equivalent for the purpose of this Regulation.

3. The amendments to Annex 6 are proposed to make the text clearer and because there are no tyres in the scope of this UN Regulation "not marked with speed symbol".

**Economic and Social Council**Distr.: General
16 July 2018

Original: English

Economic Commission for Europe**Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Automated/Autonomous and Connected Vehicles*****First session**

Geneva, 25-28 September 2018

Item 14 (a) of the provisional agenda

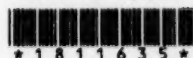
**Remaining activities from the former Working Party
on Brake and Running Gear (handover period):****Tyres****Proposal for a Supplement to UN Regulation No. 30
(Pneumatic tyres for passenger vehicles and their trailers)****Submitted by the experts from the European Tyre and Rim Technical
Organisation****

The text reproduced below was prepared by the experts from the European Tyre and Rim Technical Organisation (ETRTO) amending UN Regulation No. 30 and already considering its Supplement 20 adopted in March 2018 but not yet in force. The modifications to the existing text of the UN Regulation are marked in bold for new or strikethrough for deleted characters.

* Formerly: **Working Party on Brakes and Running Gear (GRRF)**.

** In accordance with ECE/TRANS/274, para 52, with ECE/TRANS/WP.29/1139, para. 33 and with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-11635(E)



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I. Proposal

Paragraph 2.1., amend to read:

"2.1. "Type of tyre" means tyres which do not differ in such essential characteristics as:

...

(d) Structure (diagonal (bias-ply), bias-belted, **radial** (radial-ply), run flat tyre);"

Paragraph 2.8.3., amend to read:

"2.8.3. "Radial" or "radial-ply" describes tyre structure in which the ply cords extend to the beads and are laid substantially at 90° to the centre line of the tread, the carcass being stabilized by an essentially inextensible circumferential belt;"

Paragraph 2.8.7., amend to read:

"2.8.7 "Run flat tyre" or "Self supporting tyre" describes a tyre structure provided with any technical solutions (for example, reinforced sidewalls, etc.) allowing the tyre, mounted on the appropriate wheel and in the absence of any supplementary component, to supply the vehicle with the basic tyre functions, at least, at a speed of 80km/h (~~50 mph~~) and a distance of 80 km when operating in flat tyre running mode."

Insert new paragraph 2.9., to read:

"2.9. "Extended Mobility Tyre (EMT)" describes a tyre with a radial structure allowing the tyre, mounted on the appropriate wheel and in the absence of any supplementary component, to provide the vehicle with the basic tyre functions at a speed of 80 km/h and a distance of 80 km when operating in flat tyre running mode."

Former paragraphs from 2.9. to 2.39., shall be renumbered as paragraphs 2.10. to 2.40..

Paragraph 2.16.1. (former 2.15.1.), amend to read:

"2.16.1. However, in case of tyres identified by the "tyre to rim fitment configuration" (see para. ~~3.1.10~~ 2.25.1.) symbol "A" or "U", it means the area of the tyre which is seating on the rim."

Former paragraph 2.40., to be deleted.

Paragraph 3.1.9., amend to read (paragraph number to be corrected):

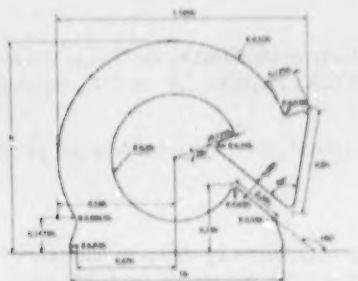
"3.1.98. The word "TUBELESS" if the tyre is designed for use without an inner tube;"

Paragraph 3.1.12., amend to read:

"3.1.12. In the case of tyres first approved after the entry into force of Supplement 13 to the 02 series of amendments to UN Regulation No. 30, the identification referred to in paragraph 2.423.1.5. shall be placed immediately after the rim diameter marking referred to in paragraph 2.423.1.3."

Insert new paragraph 3.1.15., to read:

"3.1.15. The symbol below if the tyre is an EMT, where "h" is at least 12 mm.



Paragraph 3.4.1., amend to read:

"3.4.1. However, for tyres identified by the "tyre to rim fitment configuration" (see para. 3.1.10 2.25.1.), symbol "A" or "U", the markings may be placed anywhere on the outside sidewall of the tyre."

Insert new paragraph 4.1.9., to read:

"4.1.9. Whether the tyre is an EMT;"

Former paragraphs 4.1.9. to 4.1.16., shall be renumbered as paragraphs 4.1.10. to 4.1.17.

Paragraph 4.1.15. (former 4.1.14.), amend to read:

"4.1.15. The factor x referred to in paragraph 2.226. above."

Paragraph 6.1.1.3., amend to read:

"6.1.1.3. However, for tyres identified by the "tyre to rim fitment configuration" (see para. 3.1.10 2.25.1.) symbol "A" or "U", K shall be taken equal to 0.6."

Paragraph 6.1.2.1., amend to read:

"6.1.2.1. The outer diameter of a tyre shall be obtained by means of the following formula:

...

D is the nominal rim diameter defined in paragraph 2.23-24. above, expressed in millimetres;

..."

Paragraph 6.1.2.3., amend to read:

"6.1.2.3. However, for tyres identified by the "tyre to rim fitment configuration" (see para. 3.1.10 2.25.1.) symbol "A" or "U", the outer diameter shall be that specified in the tyre size designation as shown on the sidewall of the tyre."

Paragraph 6.1.4.2.4., amend to read:

"6.1.4.2.4. However, for tyres identified by the "tyre to rim fitment configuration" (see para. 3.1.10 2.25.1.) symbol "A" or "U", the overall width of the tyre, in the lower area of the tyre, equals the nominal width of the rim on which the tyre is mounted, as shown by the manufacturer in the descriptive note, increased by 20 mm."

Paragraph 6.1.5.1., amend to read:

- "6.1.5.1. For sizes listed in Annex 5, and for tyres identified by the "tyre to rim fitment configuration" (see para. 3.1.4-102.25.1.) symbol "A" or "U", the nominal section height H is equal to:

$H = 0.5 (D-d)$, rounded to the nearest mm – for references see paragraph 6.1.2.1."

Paragraph 6.2.1.1., amend to read:

- "6.2.1.1. Where application is made for tyres identified by means of letter code "ZR" within the size designation and suitable for speeds over 300 km/h (see paragraph 4.1.4-516.), the above load/speed test is carried out on one tyre at conditions appropriate for the load index marked on the tyre and the speed symbol Y. Another load/speed test must be carried out on a second sample of the same tyre type according to paragraph 2.6. of Annex 7 corresponding to the load and speed conditions specified as maximum by the tyre manufacturer (see paragraph 4.1.4-516. of this Regulation)."

Paragraph 6.2.1.2., amend to read:

- "6.2.1.2. Where application is made for the type approval of a "run flat ~~system~~-tyre" the above load speed test is carried out on one tyre, inflated as per paragraph 1.2. of Annex 7, at the load and speed conditions marked on the tyre (see paragraph 3.1.4-15. and 3.1.8.). Another load/speed test must be carried out on a second sample of the same tyre type as specified in paragraph 3. of Annex 7. The second test may be carried out on the same sample if the manufacturer agrees."

Insert new paragraph 6.2.1.3., to read:

- "6.2.1.3. Where application is made for the type approval of an EMT the above load speed test is carried out on one tyre, inflated as per paragraph 1.2. of Annex 7, at the load and speed conditions marked on the tyre (see paragraph 3.1.5. and 3.1.8.). Another load/speed test must be carried out on a second sample of the same tyre type as specified in paragraph 4. of Annex 7. The second test may be carried out on the same sample if the manufacturer agrees."

Paragraph 6.2.2.2., amend to read:

- "6.2.2.2. If a "run flat ~~system~~tyre" tyre-which, after undergoing the test as specified in paragraph 3. of Annex 7, does not exhibit a change in the deflected section height, compared to the deflected section height at the start of the test, higher than 20 per cent and retains the tread connected to the two sidewalls, it is deemed to have passed the test."

Insert new paragraph 6.2.2.3., to read:

- "6.2.2.3 If an EMT which, after undergoing the test as specified in paragraph 4. of Annex 7, does not exhibit a change in the deflected section height, compared to the deflected section height at the start of the test, higher than 20 per cent and retains the tread connected to the two sidewalls, it is deemed to have passed the test."

Annex 1, insert new item 4.6., to read:

- "4.6. Extended Mobility Tyre: (Yes / No) 2/....."

Annex 3, Paragraph 3., amend to read:

- "3. The positioning and order of the markings constituting the tyre designation shall be the following:
- (a) the size designation as defined in paragraph 2.4.2.3. of this Regulation shall be grouped as shown in the above examples: 185/70 R 14 and 185-560 R 400A or 185-560 R 400U;
 - (b) the service description comprising the load index and the speed symbol shall be placed immediately after the tyre size designation as defined in paragraph 2.4.2.3. of this Regulation;
 - (c) The symbols "TUBELESS", "REINFORCED", "M + S" and "ET" and "POR" may be at a distance from the size-designation."

Annex 6, Paragraph 1.1., amend to read:

- "1.1. Mount the tyre on the measuring rim specified by the manufacturer pursuant to paragraph 4.1.4.2.3. of this Regulation and inflate it to a pressure of 3 to 3.5 bar."

Annex 6, Paragraph 1.2.3., amend to read:

- "1.2.3. in standard radial tyres **and in standard Run Flat tyres:** to 1.8 bar;"

Annex 6, Paragraph 1.2.4., amend to read:

- "1.2.4. in reinforced radial tyres **and in reinforced Run Flat tyres:** to 2.2 bar;"

Annex 7, Paragraph 1.1., amend to read:

- "1.1. Mount a new tyre on the test rim specified by the manufacturer pursuant to paragraph 4.1.4.2.3. of this Regulation."

Annex 7, Paragraph 1.2., amend to read:

Speed category	Diagonal (bias-ply) tyres			Radial/ and Run flat tyres system		Bias-belted tyres
	Ply rating			Standard	Reinforced	Standard
	4	6	8			
L, M, N	2.3	2.7	3.0	2.4	2.8	-
P, Q, R, S	2.6	3.0	3.3	2.6	3.0	2.6
T, U, H	2.8	3.2	3.5	2.8	3.2	2.8
V	3.0	3.4	3.7	3.0	3.4	-
W	-	-	-	3.2	3.6	-
Y	-	-	-	3.2 <u>1/</u>	3.6	-

Annex 7, Paragraph 2.2.2., amend to read:

- "2.2.2. the maximum load rating associated with a maximum speed of 240 km/h for tyres Speed Symbol "V" (see para. 2.3.7.3.2. of this Regulation)."

Annex 7, Paragraph 2.2.3., amend to read:

- "2.2.3. the maximum load rating associated with a maximum speed of 270 km/h for tyres with speed symbol "W" (see paragraph 2.3.7.3.3. of this Regulation)."

Annex 7, Paragraph 2.2.3., amend to read:

- "2.2.4. the maximum load rating associated with a maximum speed of 300 km/h for tyres with speed symbol "Y" (see paragraph 2.3738.4. of this Regulation)."

Annex 7, Paragraph 2.5.2., amend to read:

- "2.5.2. initial test speed: prescribed maximum speed for the type of tyre (see para. 2.3435.1. of this Regulation), less 40 km/h in the case of the smooth wheel having 1.70 m + 1 per cent in diameter or less 30 km/h in the case of the smooth wheel having 2 m + 1 per cent in diameter;"

Annex 7, Paragraph 2.6.1., amend to read:

- "2.6.1. Apply to the test axle a load equal to 80 per cent of the maximum load rating associated with the maximum speed specified by the tyre manufacturer (see paragraph 4.1.4516. of this Regulation)."

Annex 7, Paragraph 3., amend to read:

- "3. Procedure to assess the "flat tyre running mode" of "run flat systemtyre"

Annex 7, Paragraph 3.1., amend to read:

- "3.1. Mount a new tyre on the—a test rim corresponding to the following specifications:

- (a) Measuring rim width, according to ISO 4000-1
- (b) Contour with hump (round or flat) on both rim sides, according to ISO 4000-2.

specified by the manufacturer pursuant to paragraphs 4.1.12. and 4.1.15. of this Regulation."

Annex 7, Paragraph 3.2., amend to read:

- "3.2. Carry out the procedure as detailed in paragraphs 1.2. to 1.5. above with a test room temperature at $38\text{ }^{\circ}\text{C} + 3\text{ }^{\circ}\text{C}$ in relation to conditioning the tyre-and-wheel assembly as detailed in paragraph 1.4. The temperature sensor shall be at a distance not less than 0.15 m and not more than 1.00 m from the tyre sidewall."

Annex 7, Paragraph 3.8.2., amend to read:

- "3.8.2. Test speed: 80 km/h in case of $2.0\text{ m} \pm 1\text{ per cent drum diameter}$, or 75 km/h in case of $1.7\text{ m} \pm 1\text{ per cent drum diameter}$ "

Annex 7, insert new paragraphs from 4. to 4.9.1., to read:

- "4. Procedure to assess the "flat tyre running mode" of "extended mobility tyres"

- 4.1. Mount a new tyre on a test rim corresponding to the following specifications:

- (a) Measuring rim width, according to ISO 4000-1
- (b) Contour with hump (round or flat) on both rim sides, according to ISO 4000-2.

- 4.2. Carry out the procedure as detailed in paragraphs 1.2. to 1.5. above with a test room temperature at $25\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ in relation to conditioning the tyre-and-wheel assembly as detailed in paragraph 1.4. The temperature

sensor shall be at a distance not less than 0.15 m and not more than 1.00 m from the tyre sidewall.

- 4.3. Remove the valve insert and wait until the tyre deflates completely.
- 4.4. Mount the tyre-and-wheel assembly to a test axle and press it against the outer surface of a smooth wheel $1.70 \text{ m} \pm 1 \text{ per cent}$ or $2.0 \text{ m} \pm 1 \text{ per cent}$ in diameter.
- 4.5. Apply to the test axle a load equal to 60 per cent of the maximum load rating corresponding to the load capacity index of the tyre.
- 4.6. At the start of the test, measure the deflected section height (Z1).
- 4.7. During the test the temperature of the test room must be maintained at $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$.
- 4.8. Carry the test through, without interruption in conformity with the following particulars:
 - 4.8.1. Time taken to pass from zero speed to constant test speed: 5 minutes
 - 4.8.2. Test speed: 80 km/h in case of $2.0 \text{ m} \pm 1 \text{ per cent}$ drum diameter, or 75 km/h in case of $1.7 \text{ m} \pm 1 \text{ per cent}$ drum diameter
 - 4.8.3. Duration of test at the test speed: 60 minutes
- 4.9. At the end of the test, measure the deflected section height (Z2).
- 4.9.1. Calculate the change in per cent of the deflected section height compared to the deflected section height at the start of the test as $((Z1 - Z2) / Z1) \times 100$."

Annex 7, Paragraph 4. (former), renumber as paragraph 5 and amend to read:

- "45. Equivalent test methods
If a method other than that described in paragraphs 2. and/or 3, and/or 4. above is used, its equivalence must be demonstrated."

II. Justification

1. This document presents amendments corresponding to the introduction of "Extended Mobility Tyre" as a new definition in UN Regulation No. 30, based on a new "minimum requirement" performance test procedure, along with the relevant pictogram to be used to properly distinguish such tyres.

2. This proposal follows what has already been presented to Working Party on Brakes and Running Gear through informal documents GRRF-86-04 and GRRF-86-05.

**Economic and Social Council**

Distr.: General
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Original: English

Economic Commission for Europe**Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Automated/Autonomous and Connected Vehicles*****First session**

Geneva, 25-28 September 2018

Item 14 (a) of the provisional agenda

**Remaining activities from the former Working Party
on Brake and Running Gear (handover period):**

Tyres

**Proposal for a Supplement to UN Regulation No. 64
(Uniform provisions concerning the approval of vehicles with
regard to their equipment which may include: a temporary-
use spare unit, run-flat tyres and/or a run-flat system)**

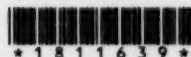
**Submitted by the experts from the European Tyre and Rim Technical
Organisation****

The text reproduced below was prepared by the experts from the European Tyre and Rim Technical Organisation (ETRTO) amending UN Regulation No. 64. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters.

* Formerly: Working Party on Brakes and Running Gear (GRRF).

** In accordance with ECE/TRANS/274, para 52, with ECE/TRANS/WP.29/1139, para. 33 and with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-11639(E)



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I. Proposal

Title, amend to read:

"Uniform provisions concerning the approval of vehicles with regard to their equipment which may include: a temporary use spare unit, run flat tyres **and/or a run flat system and/or extended mobility tyres**"

Paragraph 1., amend to read:

"1. This Regulation applies to the approval of vehicles of category M1 and N1 when equipped with:

- (a) A temporary use spare unit; and/or
- (b) Run-flat tyres and/or a run-flat system **and/or**
- (c) **Extended mobility tyres.**

For the purposes of this Regulation, spare wheel and tyre substitute units in the form of run-flat tyres or a run-flat system **or extended mobility tyres** in a totally deflated condition, are to be treated as being temporary-use spare units as defined in paragraph 2.10. of this Regulation."

Insert new paragraph 2.4.5., to read:

"2.4.5. **"Extended Mobility Tyre"** describes a pneumatic radial tyre designed to operate in an inflated mode and allowing the pneumatic tyre, mounted on the appropriate wheel and in the absence of any supplementary component, to provide the vehicle with the basic tyre functions at a speed of 80 km/h (50 mph) and a distance of 80 km when operating in flat tyre running mode."

Paragraph 2.10.5., amend to read:

"2.10.5. Type 5

An assembly in which a wheel and tyre unit as defined in paragraph 2.4.3. or 2.4.4. **or 2.4.5.** is fitted to the vehicle for normal, long term road use, but used in an emergency in a totally deflated condition."

Paragraph 5.1.5., amend to read:

"5.1.5. Except in the case of a run-flat/self-supporting tyres or run-flat/extended mobility system **or extended mobility tyres**, it is permitted to supply only one temporary-use spare unit with the vehicle."

Paragraph 5.1.6., amend to read:

"5.1.6. In the case of vehicles equipped with run-flat/self-supporting tyres or run-flat/extended mobility system **or extended mobility tyres**, the vehicle shall also be fitted with a Run-Flat Warning System (defined in paragraph 2.13.) capable of operating within a speed range from 40 km/h to the maximum design speed of the vehicle and meeting the requirements of paragraphs 5.1.6.1. to 5.1.6.6. However, if the vehicle is fitted with a Tyre Pressure Monitoring System meeting the requirements of UN Regulation No. 141, the additional fitment of a run-flat warning system is not required."

Annex 1., amend to read:

" [...]

of a vehicle type with regard to their equipment which /may include: a temporary-use spare unit, run-flat tyres and/or a run-flat system and/or **extended mobility tyres**,² pursuant to UN Regulation No. 64."

Annex 1, Item 9.3., amend to read:

"9.3. Details of temporary-use spare unit, including wheel and tyre size designations and marking, tyre load and speed capability, run-flat tyre, **extended mobility tyre** including the maximum distance wheel offset (where different from standard unit)."

Annex 3, Paragraph 1.5., amend to read:

"1.5. Except in the case of a run-flat tyre **or of an extended mobility tyre**, the tyres shall be inflated to the pressures recommended by the vehicle manufacturer for the vehicle type and loading condition. A run-flat tyre **or an extended mobility tyre** shall be tested in the fully deflated condition."

II. Justification

The proposed amendments are intended to properly take into account and implement the changes proposed to UN Regulation No. 30 as per ECE/TRANS/WP.29/GRVA/2018/6.

**Economic and Social Council**

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Economic Commission for Europe**Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Automated/Autonomous and Connected Vehicles*****First session**

Geneva, 25-28 September 2018

Item 14 (a) of the provisional agenda

**Remaining activities from the former Working Party
on Brake and Running Gear (handover period):**

Tyres

**Proposal for amendments to UN Regulation No. 106 (Tyres
for agricultural vehicles and their trailers)**

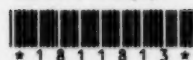
**Submitted by the expert from the European Tyre and Rim Technical
Organisation (ETRTO)****

The text reproduced below was prepared by the experts from the European Tyre and Rim Technical Organisation (ETRTO) amending Regulation No. 106. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters if not specified differently.

* Formerly: **Working Party on Brakes and Running Gear (GRRF)**

** In accordance with ECE/TRANS/274, para 52, with ECE/TRANS/WP.29/1139, para. 33 and with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-11813(E)



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I. Proposal

Paragraph 1., amend to read:

"1. Scope

~~This Regulation covers new pneumatic tyres* designed primarily, but not only, for agricultural and forestry vehicles (power-driven vehicles in category T), agricultural machines (power-driven and trailed) and agricultural trailers, and identified by speed category symbols corresponding to speeds of 65 km/h (speed symbol "D") and below.~~

~~It does not apply to tyre types designated primarily for other purposes, such as:~~

~~(a) — Earth-moving equipment;~~

~~(b) — Industrial and lift trucks.~~

1.1. This UN Regulation applies to new pneumatic tyres* designed primarily, but not only, for agricultural and forestry vehicles in categories T, R and S¹.

1.2. This UN Regulation does not apply (UN approvals to this UN Regulation may not be granted) to the following tyres:

1.2.1. Tyres identified by speed category symbols corresponding to speeds higher than 65 km/h (i.e. speed category symbols higher than "D").

1.2.2. Tyres designated primarily for other purposes, such as:

(a) Earth-moving equipment;

(b) Industrial and lift trucks."

Paragraph 3.1.9.2. (former), renumber and amend to read:

"3.1.9-2-10.1. The inscription 'I-3' for implement tyres with traction tread as identified in Annex 5, Tables 5 and 6."

Annex 5, Table 5, Note 3, amend to read:

"3. Overall diameters (D) in column (*) apply to tyres marked with classification code "I-3" – see paragraph 3.1.9-2-10.1. of this Regulation."

Annex 5, Table 6, Note 3, amend to read:

"3. Overall diameters (D) in column (*) apply to tyres marked with classification code "I-3" – see paragraph 3.1.9-2-10.1. of this Regulation."

Annex 5, Table 7 (3 of 4), amend to read:

Tyre size designation ⁵	Theoretical rim width code (A1)	Nominal section width (S1) (mm)	Overall diameter (D) (mm)	Nominal rim diameter (d) (mm)
...	...	...	...	...
3536x16-17.5	10.5	406	914	445
...	...	...	...	...

Annex 7, Part E, amend the table to read:

Speed (km/h)	Speed Category Symbol				
	A2	A8		D	
		Constant load	Cyclic applications (+)	Constant load	Cyclic applications (+)
5	+ 11	+ 45	+ 67 (1)	+67	+92 (1)
10	0	+ 25	+ 50 (2)	+44	+73 (2)
15	- 21	+ 13	+ 34	+30	+54
20	- 24	+ 9	+ 23	+26	+42
25	- 28	+ 6	+ 11	+22	+28
30	- 32	+ 4	+ 7	+20	+23
35	- 33	+ 2	+ 3	+18	+19
40	- 34	0	0	+15	+15
45	- 35	- 4	- 4	+12	+12
50	- 37	- 9	- 9	+8	+8
55	-	-	-	+5	+5
60	-	-	-	+3	+3
65	-	-	-	0	0
70	-	-	-	-9	-9

II. Justification

1. The modification of the scope structure is drafted in line with the example provided in Annex 2 in informal document WP29-175-03. In addition to this modification, the proposed amended scope refers to the vehicle categories S and R defined in the "Consolidated Resolution on the Construction of Vehicles (R.E.3), as follow:"

"2.6. Agricultural vehicles (Categories T, R and S)

2.6.1. "Category T" - means any motorised, wheeled or tracked agricultural or forestry vehicle having at least two axles and a maximum design speed of not less than 6 km/h, the main function of which lies in its tractive power and which has been especially designed to pull, push, carry and actuate certain interchangeable equipment designed to perform agricultural or forestry work, or to tow agricultural or forestry trailers or equipment; it may be adapted to carry a load in the context of agricultural or forestry work and/or may be equipped with one or more passenger seats.

2.6.2. "Category R - Agricultural trailer": means any agricultural or forestry vehicle intended mainly to be towed by a tractor and intended mainly to carry loads or to process materials and where the ratio of the technically permissible maximum laden mass to the unladen mass of that vehicle is equal to or greater than 3.0.

2.6.3. "Category S - Interchangeable towed equipment": means any vehicle used in agriculture or forestry which is designed to be towed by a tractor, changes or adds to its functions, permanently incorporates an implement or is designed to process materials, which may include a load platform designed and

constructed to receive any tools and appliances needed for those purposes and to store temporarily any materials produced or needed during work and where the ratio of the technically permissible maximum laden mass to the unladen mass of that vehicle is less than 3.0."

2. The change of the numbering is necessary for Paragraph 3.1.9.2. into 3.1.10.1. because para. 3.1.9.2. refers to implement tyres while para. 3.1.9. refers to forestry tyres. In Paragraph 3.1.10. refers to implement tyres hence it is deemed more appropriate to modify the paragraph number "3.1.9.2." to "3.1.10.1.". Following this modification, Notes 3 in Annex 5, Table 5 and Table 6 shall be amended.
 3. The line in Annex 5, Table 7 (3 of 4) has been mistakenly introduced in Supplement 16 as 35x16 – 17.5 in place of 36x16 – 17.5 and this proposal is intended to fix the error.
 4. The amendment (extension) of the table in Annex 7, Part E, is needed to account for the variation of load carrying capacity for tyres for construction applications (industrial tractors or skid-steers / mini-loaders) with speed category symbol "D".
-

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Item 9 (a) of the provisional agenda

Motorcycle braking:

UN Global Technical Regulation No. 3

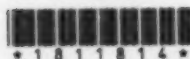
**Proposal for an amendment to UN Global Technical
Regulation No. 3 (Motorcycle brake systems)****Submitted by the expert from Italy****

The text reproduced below was prepared by the expert from Italy proposing amendments to Global Technical Regulation (GTR) No. 3. It is a revised version of the proposal ECE/TRANS/WP.29/GRRF/2017/15 distributed at the eighty-fourth session of the Working Party on Brakes and Running Gear (GRRF) and informal document GRRF 86-10 distributed at the eighty-sixth session. The modifications to the text of UN GTR No. 3 are marked in bold for new characters or strikethrough for deleted characters.

* Formerly: **Working Party on Brakes and Running Gear (GRRF)**.

** In accordance with ECE/TRANS/274, para 52, with ECE/TRANS/WP.29/1139, para. 33 and with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-11814(E)



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I. Statement of technical rationale and justification

A. Introduction

1. One of the main purposes of UN Global Technical Regulation (GTR) No. 3 is to reduce the injuries and fatalities associated with motorcycle accidents by addressing the braking performance of motorcycles as a means of improving road safety.
2. UN GTR No. 3 provides clear and objective test procedures and requirements that can be easily followed and addresses the development of current Combined Braking Systems (CBS) and Anti-lock Braking System (ABS) technologies.
3. The objective of this proposal is to amend the current UN GTR No. 3 to technical progress addressing: electromagnetic immunity of ABS-systems, introducing ABS performance requirements for category¹ 3-5 vehicles (three-wheelers), ensuring uniform requirements for equipment such as Electronic Stop Signal (ESS) system and the means to disable the ABS, if equipped.

B. Justification of changes

4. The proposals aim to harmonise the UN GTR with the Supplement 3 to the 03 series of amendments to UN Regulation No. 78 as adopted at June 169th session of WP.29 and the 04 series of amendments as adopted during the 170th session of WP.29.
5. The development of draft language for updating the GTR involved consideration of the differences between the respective 1998 Agreement and 1958 Agreement. As the various amendments to UN Regulation No. 78 caused dis-harmonization with UN GTR No. 3, various proposals have been considered between the eighty-first and the eighty-seventh GRRF sessions to incorporate the harmonisation, collecting support and commitment of the Contracting Parties under the 1998 agreement. The main technical issues, including their justification for updating the global technical regulation are:

1. Electromagnetic immunity of ABS systems, paragraph 3.1.14.

6. With the increasing number and complexity of electronic braking devices, it is important to ensure that the braking performance is not affected electromagnetic perturbations by verifying the electromagnetic immunity. This UN GTR No. 3 amendment proposal is harmonised with UN Regulation No. 78, Supplement 3 to the 03 series (ECE/TRANS/WP.29/2016/56), amended by WP29-169-03. The specificities of self-certification have been considered, by providing for Contracting Parties to this UN GTR, to refer to national standards or to national regulations, in the case Electromagnetic Compatibility (EMC) Regulations if applicable in their national or regional situation.

2. Apply existing Anti-Lock Braking Systems (ABS) requirements to all vehicles of category 3, paragraph 4.9.1.

7. To apply the existing Anti-Lock Braking Systems (ABS) requirements to all vehicles of Category 3, based on ECE/TRANS/WP.29/GRRF/2015/42. If such vehicles were equipped with ABS, without the amendment, there would be no specific requirements

¹ As defined in the Special Resolution No. 1 concerning the common definitions of vehicle categories, masses and dimensions (S.R.1), document ECE/TRANS/WP.29/1045, Amend 1 and 2, Annex 2 - www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

for the ABS braking performance in the GTR. This UN GTR No. 3 amendment proposal is harmonised and maintains technical compatibility with Regulation No. 78, Supplement 3 to the 03 series (ECE/TRANS/WP.29/2016/56, amended by WP29-169-03). The specificities of the 1998 Agreement have been taken into account as the scope extension of the ABS requirements is not extended to quadricycles (L₄ and L₇) vehicles² as due to the absence of definitions for this type of vehicles in Special Resolution adopted by the Executive Committee (AC.3) of the 1998 Agreement (S.R.1) relevant for the 1998 Agreement.

3. Emergency Stop Signal, paragraph 2.22. and 3.1.15. to 3.1.15.2.

8. The paragraphs 2.22. and 3.1.15. to 3.1.15.2. aim to introduce the installation of ESS on motorcycles. This proposed amendment involves only the condition of activating an ESS, not the lighting requirements. ESS is available on the market for motor vehicles. As motorcycles are used in the same traffic conditions, the option was considered to be beneficial also on motorcycles. The benefit of defining ESS provisions for vehicles of category 3 is to ensure similar behaviour as other road vehicles by harmonising the activation and deactivation criteria of ESS as applied to cars.

9. This UN GTR No. 3 amendment proposal is harmonised with UN Regulation No. 78, Supplement 3 to the 03 series (ECE/TRANS/WP.29/2016/56, amended by WP29-169-03). The associated amendment of Regulation No. 53 (lighting installation for L₃ vehicles) was adopted at 168th session of WP.29 (ECE/TRANS/WP.29/2016/22).

4. Means to disable the ABS function, paragraph 3.1.16.

10. This proposal is aimed at specifying the provisions for how to disable ABS and when this may be appropriate. Providing riders the ability to reduce or turn off ABS function completely on certain types of motorcycles is an important feature: there are riding conditions where locking the rear wheel is appropriate, such as deformable surfaces. Providing the rider a means to turn ABS off may limit the customers desire to tamper with the system and turn ABS off in a more permanent way, which could make ABS less available when needed.

11. The purpose of a two-step means of disabling ABS is intended to ensure disabling ABS is an intentional choice of the rider and providing reasonable provisions to ensure ABS is not inadvertently disabled. Conversely specifying a "simple" means of re-enabling ABS is intended to ensure the rider can at any time bring ABS back to full function. Re-enabling at ignition cycle is intended to prevent riders from inadvertently leaving ABS disabled when coming back to the bike.

12. With regards to the restriction to certain type of vehicles, the interpretation of 'off road' capability is to be determined by the manufacturer, based on product design and testing for expected customer usage building on consensus at the eighty-first session of GRRF, where delegates agreed *'to not unnecessarily restrict the kind of vehicle that could be equipped with the off switch function, by softening the wording of these provisions'*.

13. The new paragraph 3.1.16. clarifies the requirements of a means to disable the ABS function, if fitted, ("ABS Switch") for vehicles of Category 3. With this amendment, it is ensured that the implementation of an "ABS switch" is clear and uniform across different markets: *i.e.* if a vehicle is equipped with a function to disable the ABS, the ABS operation

² As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.6, para. 2 - <https://www.unece.org/fileadmin/DAM/trans/main/wp29/resolutions/ECE-TRANS-WP.29-78r6c.pdf>

status should be clear when starting, when in motion. In addition, disabling the ABS function should not be possible inadvertently.

14. The proposal is based on informal document GRRF-83-09 submitted by the representative of Italy and subsequent discussions in GRRF. The suggestions made by the representative of Canada (see GRRF-83-10) to include language about switching 'modes' to eliminate confusion with inconsistent use of terms 'deactivate' and 'disable' have been incorporated. It was advised to have the benefit of harmonized language similar to UN GTR No. 8, for ESC for vehicles of Category 1-1, 1-2 and 2. Situations described in the UN GTR No. 8, rationale (paragraph 83) for why different modes are needed did not seem applicable to motorcycle ABS. Simple ON/OFF functionality is considered sufficient. To address comments of inconsistencies of word use, the text was updated to refer simply to 'disable' or 'enable'.

15. As there are multiple indicators currently defined by International Standardization Organization (ISO), or other Standard Developing Organizations, they were also specified as acceptable in this proposal. This includes the use of text to label the indicator as allowed by the Federal Motor Vehicle Safety Standard (FMVSS) 122, consistent with the approach of UN GTR No. 8 and ISO 2575:2010. The ability to use the ABS malfunction indicator to also indicate disabled was retained in recognition of the limited space on a motorcycle as compared to a car and recognizing that tell-tale unequivocally indicates ABS is not available to the rider. It was considered necessary to keep the references to ISO 2575:2010 in line with the text in UN Regulation No. 78. The reference to ISO allows minor changes to the pictograms due to limitations in reproduction and display technologies and ensuring appearance and perceptibility of graphical symbols and information or to coordinate with the design of the equipment.

16. Following discussion at eighty-fourth session of GRRF, as suggested by Canada in GRRF-84-10, paragraph 5.1.15.3. in UN Regulation No. 78 that reads *'The method of determining deceleration is the responsibility of the manufacturer as long as the vehicle meets the technical requirements of this section. (ex. a prediction of deceleration from wheel rotation).'* was not taken across to the GTR as it was considered unnecessary in a self-certification system and keep the text certification neutral.

17. Sub-point (g) in this GTR amendment proposal, which makes it more explicit that manufacturers cannot provide additional means of disabling ABS, is included as a means of preventing defeat devices to be introduced. This supports the direction requested by the Contracting Parties at eighty-fourth session of GRRF who felt this prohibition needed to be explicit and allowed a provision that is acceptable in self-certifying markets.

18. The reactivation of the ABS under paragraph 3.1.16. (g), during standstill or while driving, will start the initiation of the ABS system start-up procedure which will lead without delay to the functional stage of the ABS complying with the system specification in paragraph 4.9. A time related delay cannot be specified due to technical issues regarding ABS system start-up procedure that include, but not limited to:

- When activating the system in a stationary condition, the system calibration/verification can only take place after motion of the wheel and can't determine how long the bike will be on before the rider chooses to start riding.
- The ABS system needs the opportunity to determine if vehicle maybe in a condition where it could be detrimental to the rider to activate ABS immediately. One example is a vehicle with a rear wheel locked and sliding sideways; activating the ABS and releasing the rear wheel lock could cause the bike to high side.
- Level of technology/equipment and features may require different amount of times to complete start-up procedure.

- The language should be such that the improvement of safety technologies is not limited by the regulation.

19. In paragraph 2.23, it is clarified that disabling of the ABS is allowed at one or more wheels to avoid different interpretations: e.g. turning ABS off on just the rear wheel(s), and leaving front ABS on is allowed, but would still be considered ABS off and need to adhere to paragraph 3.1.16.

C. Countries that have incorporated UN GTR No. 3 into their regulations

Canada
European Union
Japan
Republic of India
Republic of Korea
Russian Federation
United States of America

II. Proposed amendments

Insert a new paragraph 2.22. and 2.23., to read:

- "2.22. **"Emergency braking signal"** means logic signal indicating emergency braking specified in paragraphs 3.1.15. to 3.1.15.2. of this Regulation.
- "2.23. **"Disable the antilock brake system"** means to put the system into a state where one or more wheel(s) fitted with an antilock brake system no longer fulfils the technical requirements in paragraph 4.9. of this Regulation."

Insert a new paragraph 3.1.14., to read:

- "3.1.14. The effectiveness of the braking systems, including the anti-lock system, shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by fulfilling the technical requirements in national standards or regulations, if applicable."

Insert new paragraphs 3.1.15. to 3.1.15.2., to read:

- "3.1.15. If a vehicle is equipped with the means to indicate emergency braking, activation and de-activation of the emergency braking signal shall only be generated by the application of any service braking system when the conditions in paragraphs 3.1.15.1. through 3.1.15.2. are fulfilled:
- 3.1.15.1. The signal shall not be activated when the vehicle deceleration is below 6 m/s^2 but it may be generated at any deceleration at or above this value, the actual value being defined by the vehicle manufacturer.
- The signal shall be de-activated at the latest when the deceleration has fallen below 2.5 m/s^2 ; or,
- 3.1.15.2. The signal may be activated at a speed above 50 km/h when the antilock system is fully cycling (as defined in paragraph 4.9.1.) and deceleration is at least 2.5 m/s^2 . The signal shall be deactivated when the antilock system is no longer fully cycling".

Insert a new paragraph 3.1.16., to read:

"3.1.16. A means to deactivate the antilock brake system is only permitted for vehicles which are suitable for "off-road" driving.

If a means to disable the antilock brake system is provided it shall meet the following provisions:

(a) Disabling the antilock brake system function shall only be allowed when the vehicle is fitted with a ride mode selector that is in an "off-road" or "all-terrain" mode.

(b) Disabling the antilock brake system function shall only be allowed when the vehicle is stationary;

(c) Disabling the antilock brake system function shall be the result of a deliberate action by the rider according to one of the following methods:

(i) Simultaneous actuation of the antilock braking system disable-switch and a service brake system control (i.e. brake lever or pedal); or

(ii) The actuation of the antilock brake system disable-switch for a minimum of two seconds; or

(iii) The progression through at least two successive steps or levels of actuation of a control (e.g., rotating knob, a touch panel or a menu option selector).

(d) The antilock brake system function shall be automatically enabled when exiting from the "off-road" or "all-terrain" ride mode, or after each start-up of the vehicle, except for restarts after unintentional stalling of the engine.

(e) When disabled, the antilock brake system function shall be indicated by the activation of a yellow or amber tell-tale according to one of the following methods until the ABS is fully functional or operating again:

(i) The following symbol as specified in B.18 in ISO 2575:2010:



Or

(ii) The following symbol as specified in B.05 of ISO 2575:2010:



With the word "OFF" as follows, according to Y.01 in ISO 2575:2010, whereby the relative position and size of the two symbols are defined by the vehicle manufacturer:

OFF

Or;

- (iii) The text "ABS OFF", or "ABS not available", or,
- (iv) The warning lamp referred to in paragraph 3.1.13., continuously activated (i.e. lit or flashing).
- (v) Further to tell-tale(s) or symbol(s) specified in (i) to (iv), an additional or combined tell-tale may indicate for which wheel(s) the ABS is disabled.
- (f) Enabling of a functional stage which complies with anti-lock brake system requirements in paragraph 4.9 shall be possible through the single actuation of a control (e.g. simple press of a button or switch) initiating ABS system start-up procedure.
- (g) The manufacturer shall not make available to consumers hardware and/or software designed to allow a means of disabling ABS other than in compliance with the requirements set out in points (a) to (f).

This provision does not apply to what is required to service the ABS (e.g. electrical connectors)."

Paragraph 4.9.1., amend to read:

"4.9. ABS tests

4.9.1. General:

- (a) The tests are only applicable to the ABS if fitted on vehicle categories 3-1 and 3-3 ...
- (b) The tests are to confirm the performance of brake systems equipped with ABS and their performance in the event of ABS electrical failure..."

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Item 14 (b) of the provisional agenda

Remaining activities from the former Working Party

on Brake and Running Gear (handover period):

Mechanical coupling

**Proposal for Supplement 8 to the 01 Series of Amendments to
UN Regulation No. 55 (Mechanical couplings)****Submitted by the expert from European Association of Automotive
Suppliers****

The text reproduced below was prepared by the expert from the European Association of Automotive Suppliers (CLEPA) introducing an amendment to the UN Regulation No. 55. It is based on GRRF-86-03 and refers to ECE/TRANS/WP.29/GRRF/2014/28. It is aimed at clarifying the text of the Regulation. The modifications to the existing text of the Regulation are marked in bold for new and strikethrough for deleted characters.

-
- * Formerly: **Working Party on Brakes and Running Gear (GRRF)**.
 - ** In accordance with ECE/TRANS/274, para 52, with ECE/TRANS/WP.29/1139, para. 33 and with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-11815(E)



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I. Proposal

Annex 5,

Paragraph 13.1., amend to read:

"13.1. Devices for remote indication and remote control are permitted only on automatic drawbar couplings and automatic fifth wheel couplings.

~~Devices for remote indication and remote control are permitted only on automatic coupling devices of Classes C50 X and G50 X.~~

Devices for remote indication and remote control shall not interfere with the minimum free movement of the coupled drawbar eye or coupled semitrailer. They shall be permanently fitted to the vehicle.

All the devices for remote indication or remote control fall within the scope of testing and approval of the coupling device together with all parts of the operating devices and transmission devices."

II. Justification

1. Supplement 04 to 01 series of amendments (see ECE/TRANS/WP.29/GRRF/2014/28 and corresponding ECE/TRANS/WP.29/2015/07) deleted the second subparagraph of paragraph 13.1 (former paragraph 12.1) but this is not reflected in Revision 2 of UN Regulation No. 55. It is therefore necessary to confirm the deletion of the concerned subparagraph.

2. Furthermore, Supplement 4 to the 01 series of amendments does not clearly indicate whether the third and fourth subparagraphs of paragraph 13.1 (former paragraph 12.1) should be deleted or not. It could be interpreted in such a way that all subparagraphs are deleted or that all subparagraphs are retained. Given the discussion at GRRF at the seventy-eighth session, it seems that the intention of GRRF was to only delete the restriction on automatic coupling devices of Classes C50 X and G50 X, and therefore to only delete the second subparagraph and keep the third and the fourth subparagraph.

3. Here is for reference the text in ECE/TRANS/GRRF/2014/28 already adopted as Supplement 4 to the 01 series of amendments as per document ECE/TRANS/WP.29/2015/07:

Paragraph 12.1., amend to read:

"12.1. Devices for remote indication and remote control are permitted only on automatic **drawbar couplings and automatic fifth wheel couplings**
~~coupling devices of Classes C50 X and G50 X.~~"

4. This proposal therefore re-introduces the missing sub-paragraphs into the Regulation and as a consequence clarifies the modification to UN Regulation No. 55 intended per Supplement 4 to the 01 Series of amendments.

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Item 14 (b) of the provisional agenda

**Remaining activities from the former Working Party
on Brake and Running Gear (handover period):
Mechanical coupling**

**Proposal for a Supplement to the 01 series of Amendments to
UN Regulation No. 55 (Mechanical couplings)****Submitted by the expert from Poland****

The text reproduced below was prepared by the expert from Poland, introducing an editorial amendment to the UN Regulation No. 55, based on GRRF-86-34, clarifying the text of the Regulation. The modifications to the existing text of the Regulation are marked in bold for new and strikethrough for deleted characters.

* Formerly: **Working Party on Brakes and Running Gear (GRRF)**.

** In accordance with ECE/TRANS/274, para 52, with ECE/TRANS/WP.29/1139, para. 33 and with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.



I. Proposal

Annex 1,

Item 9.3., amend to read:

"9.3. For class A mechanical coupling device or components, including towing brackets, **if applicable**:

... "

II. Justification

1. The Regulation requires to fill in item 9.3. if mechanical coupling devices and components class A are going to be approved. In the case of a coupling ball approval as a component only, this component is not dedicated for a specific vehicle. The requirement to fill in item 9.3. in case of component seems confusing as approved coupling ball shall be treated universally and can be used in different vehicles.

2. This proposal suggests filling in item 9.3. only in case of approval of completed mechanical coupling device. Therefore, it is proposed to amend the sentence and add ", if applicable".

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Geneva, 25-28 September 2018

Item 12 of the provisional agenda

UN Regulation No. 90

**Proposal for a Supplement to the 02 series of amendments to
UN Regulation No. 90 (Replacement braking parts)****Submitted by the expert from Spain****

The text reproduced below was prepared by the expert from Spain, chairing the Special Interest Group on UN Regulation No. 90, introducing amendments to align the text in Annex 7 to the UN Regulation No. 90 with the provisions in UN Regulation No. 78, based on GRRF-86-41. It also inserts the reference to the L₄ and L₇ vehicle categories to respond to requests from the industry for type approval for the replacement brake lining assembly for vehicles category L₄ and L₇ which are included in latest version of UN Regulation No. 78. The modifications to the existing text of the Regulation are marked in bold for new and strikethrough for deleted characters.

* Formerly: Working Party on Brakes and Running Gear (GRRF).

** In accordance with ECE/TRANS/274, para 52, with ECE/TRANS/WP.29/1139, para. 33 and with the programme of work of the Inland Transport Committee for 2014–2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

GE.18-11818(E)



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I. Proposal

Annex 7, amend to read:

"Annex 7

Requirements for replacement brake lining assemblies for vehicles of category L

1. Test conditions
 - 1.1. A vehicle which is representative of the type(s) for which the replacement brake lining assembly approval is required shall be equipped with the brake lining assemblies of the type for which approval is requested and instrumented for brake testing as required by UN Regulation No. 78.
 - 1.2. Brake lining assemblies submitted for the test shall be fitted to the relevant brakes and, until a fixed burnishing procedure is established, shall be burnished to the manufacturer's instructions in agreement with the technical service.
 - 1.3. In the case of brake lining assemblies for vehicles with a combined braking system in the meaning of paragraph 2.9, 2.6, of UN Regulation No. 78 the combination(s) of brake lining assemblies for the front and the rear axle to which the approval shall be directed must be tested.
 The combination may consist of replacement brake lining assemblies for both axles and/or a replacement brake lining assembly on one and an original brake lining assembly on the other axle.
2. Tests and requirements
 - 2.1. Conformance with Regulation No. 78
 - 2.1.1. The braking system of the vehicle shall be tested according to the requirements for the vehicle category in question (L₁, L₂, L₃, L₄, L₅, L₆, L₇) in Regulation No. 78, Annex 3, paragraph 1. The applicable requirements or tests are:
 - 2.1.1.1. ~~Type 0 test with engine disconnected~~ Dry stop test - single brake control actuated
 The test is to be carried out only in the laden condition. Make ~~a minimum of six one~~ brake application ~~at spaced increments of control force or line pressure according to Annex 3, paragraphs 3.1. and 3.2., in UN Regulation No. 78 up to wheel lock, or up to a the deceleration under performance requirements defined in Annex 3, paragraph 3.3. of UN Regulation No. 78 of 6 m/s²~~ or up to the maximum allowed control force.
 Where brake lining assembly approval is required for front axle brakes the test is to be carried out on the front brakes only.
 Where brake lining assembly approval is required for rear axle brakes the test is to be carried out on the rear brakes only.
 - 2.1.1.2. Dry stop test – all service brake controls actuated

- Test is to be carried out under Annex 3, paragraph 4., UN Regulation No. 78 requirements.**
- 2.1.1.3. **Type-0 test with engine-connected High speed test**
Only applicable for vehicles of categories L₃, L₄, L₅ and L₇.
Test is to be carried out under Annex 3, paragraph 5., UN Regulation No. 78 requirements.
- 2.1.1.4. **Type-0 test with wet brakes Wet brake test**
~~Not applicable to vehicles of category L₃ or in cases of drum brakes or fully enclosed disc brakes not subjected to this test during approval to Regulation No. 78.~~
Test is to be carried out under Annex 3, paragraph 6., UN Regulation No. 78 requirements.
- 2.1.1.5. **Type-I test Heat fade test**
Only applicable for vehicles of categories L₃, L₄ and L₅.
Test is to be carried out under Annex 3, paragraph 7., UN Regulation No. 78 requirements.
- 2.1.2. The vehicle must satisfy all the relevant requirements stated in Regulation No. 78, Annex 3, paragraph 2. for that category of vehicles.
- 2.2. Additional requirements
- 2.2.1. Cold performance equivalence test
A comparison of the cold performance of the replacement brake lining assembly and the original brake lining assembly shall be made by comparing the test results of the Type-0 test as described in paragraph 2.1.1.1.
- 2.2.1.1. Make a minimum of six brake applications at spaced increments of pedal effort or line pressure up to wheel lock or, alternatively, up to a mean fully developed deceleration according to the minimum requirements in Annex 3, paragraph 3.3., UN Regulation No. 78 or up to the allowed maximum pedal force for the category of vehicle in question from an initial speed as given in Annex 3, paragraph 3.2., UN Regulation No. 78.
~~The Type-0 test as prescribed in paragraph 2.1.1.1. shall be performed with one set of the original brake lining assembly.~~
- 2.2.1.2. Note and plot pedal force or line pressure and mean fully developed deceleration for each application.
- 2.2.1.3. The replacement brake lining assembly shall be considered to show similar performance characteristics to the original brake lining assembly if the achieved mean fully developed decelerations at the same line pressure in the upper two thirds of the generated curve are within 15 per cent of those obtained with the original brake lining assembly.
- 2.2.2. Speed sensitivity test
This test is only applicable for vehicles of categories L₃, L₄ and L₅ and L₇ and shall be carried out with the laden vehicle under the test conditions defined in of the Type-0 test with engine disconnected Annex 3, paragraph 3.1. and 3.2., of UN Regulation No. 78. However, the test speeds are different.

- 2.2.2.1. From the results of the ~~Type 0 test~~ **cold performance test** as described in paragraph 2.2.1.1. determine the control force or line pressure corresponding to the minimum required mean fully developed deceleration for that category of vehicle as described in Annex 3, paragraph 3.3 of UN Regulation No. 78.
- 2.2.2.2. Using the control force or line pressure determined in paragraph 2.2.2.1. ~~and with initial brake temperature $\leq 100^{\circ}\text{C}$~~ , make three brake applications from each of the following speeds:
40 km/h, 80 km/h and 120 km/h (if $v_{\text{max}} \geq 130$ km/h).
- 2.2.2.3. Average the results for each group of three applications and plot speed against corresponding mean fully developed deceleration.
- 2.2.2.4. Mean fully developed decelerations recorded for the higher speeds shall lie within 15 per cent of that recorded for the lowest speed.

II. Justification

This proposal is addressing the facts that:

- (a) Annex 7 to UN Regulation No. 90 is not aligned with the current text of UN Regulation No. 78.
- (b) The industry is willing to request approvals for replacement brake lining assemblies for vehicles of Category L₆ and L₇, which are included in latest version of UN Regulation No. 78.